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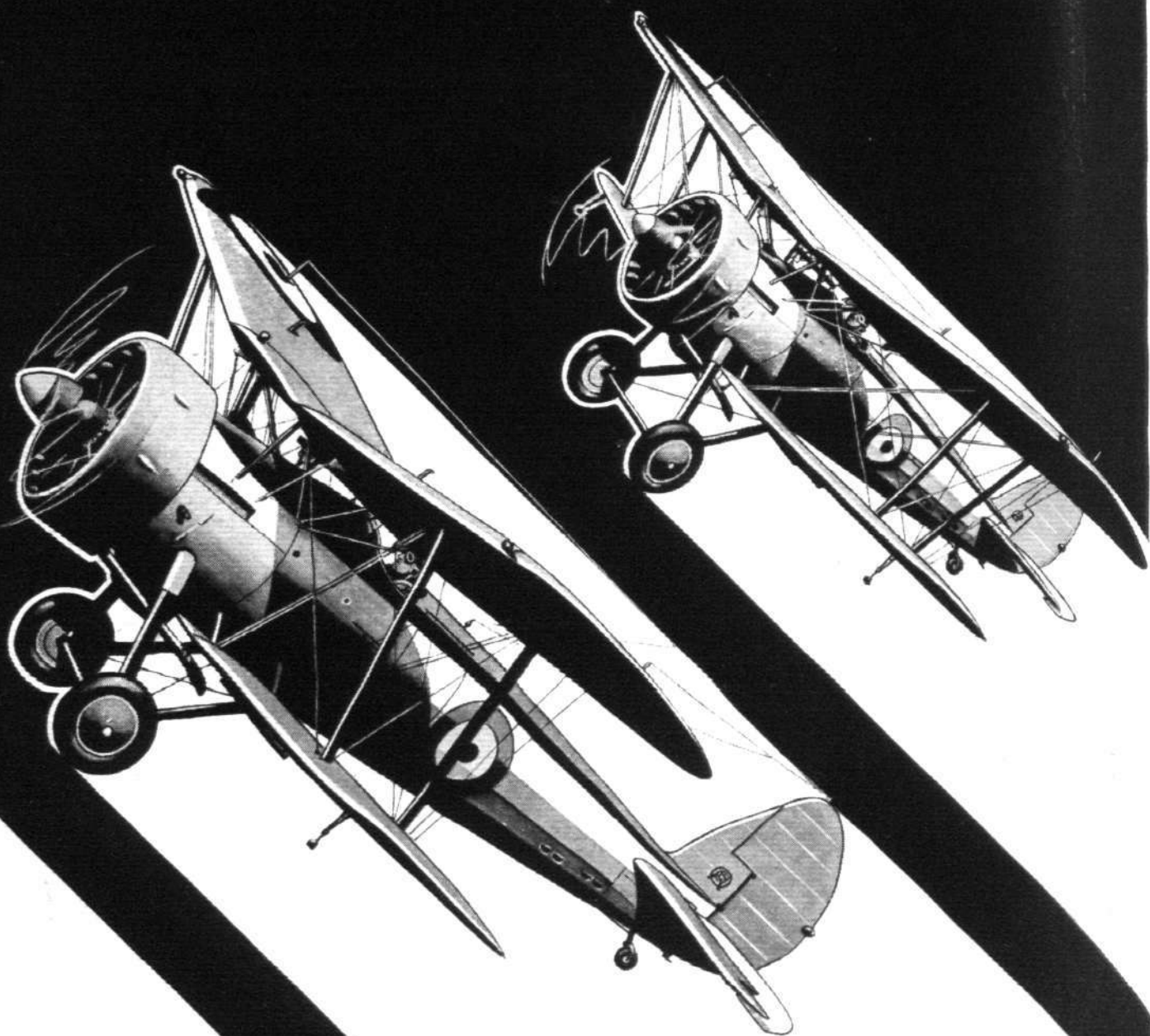
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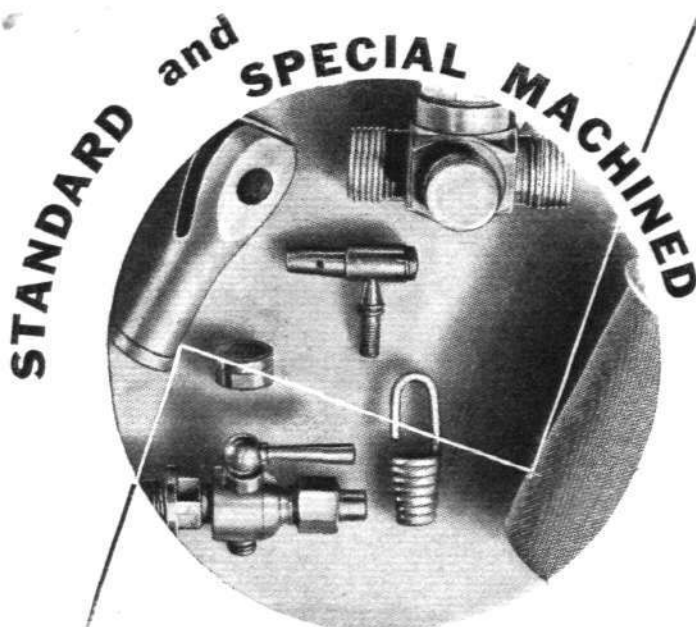
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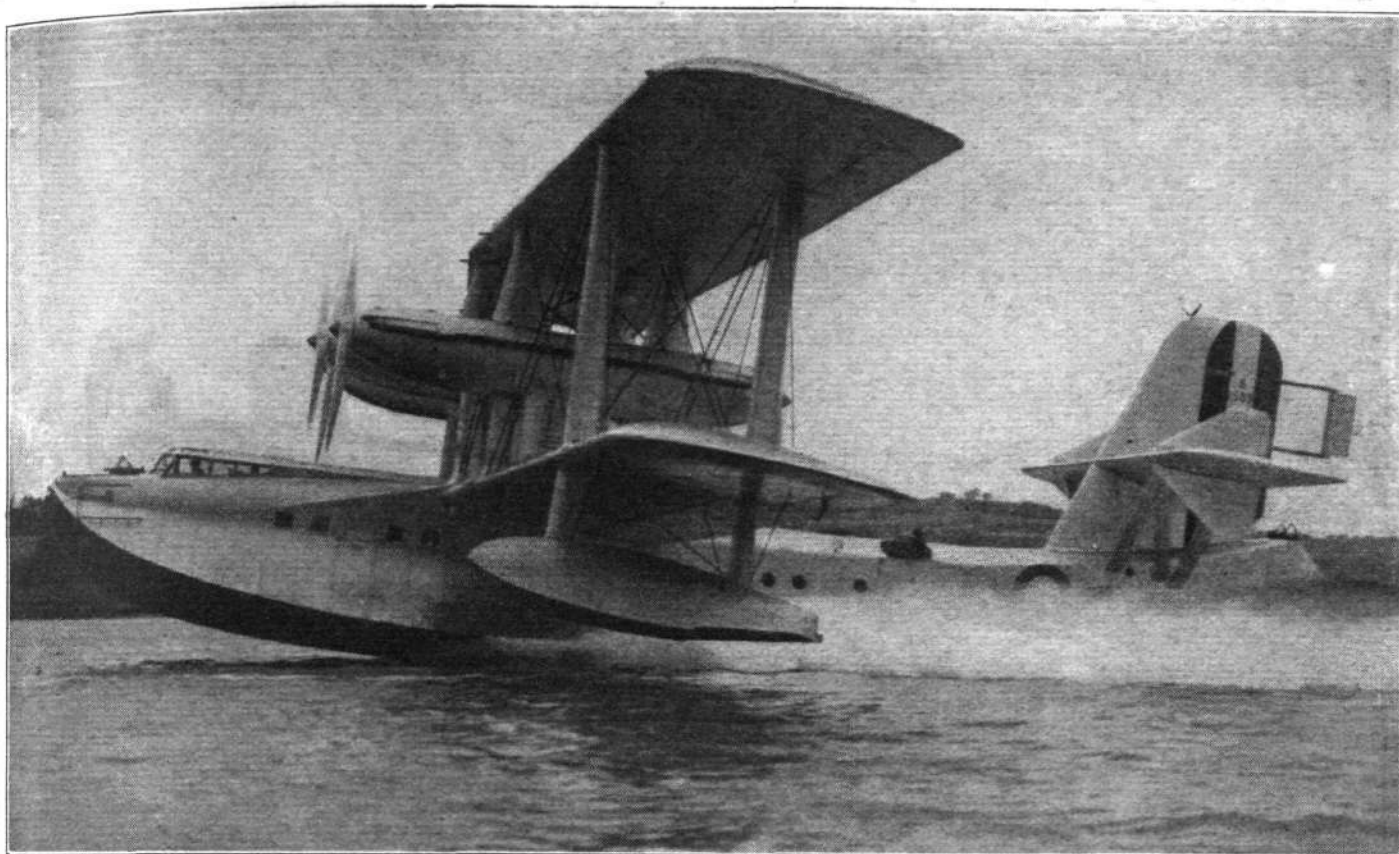
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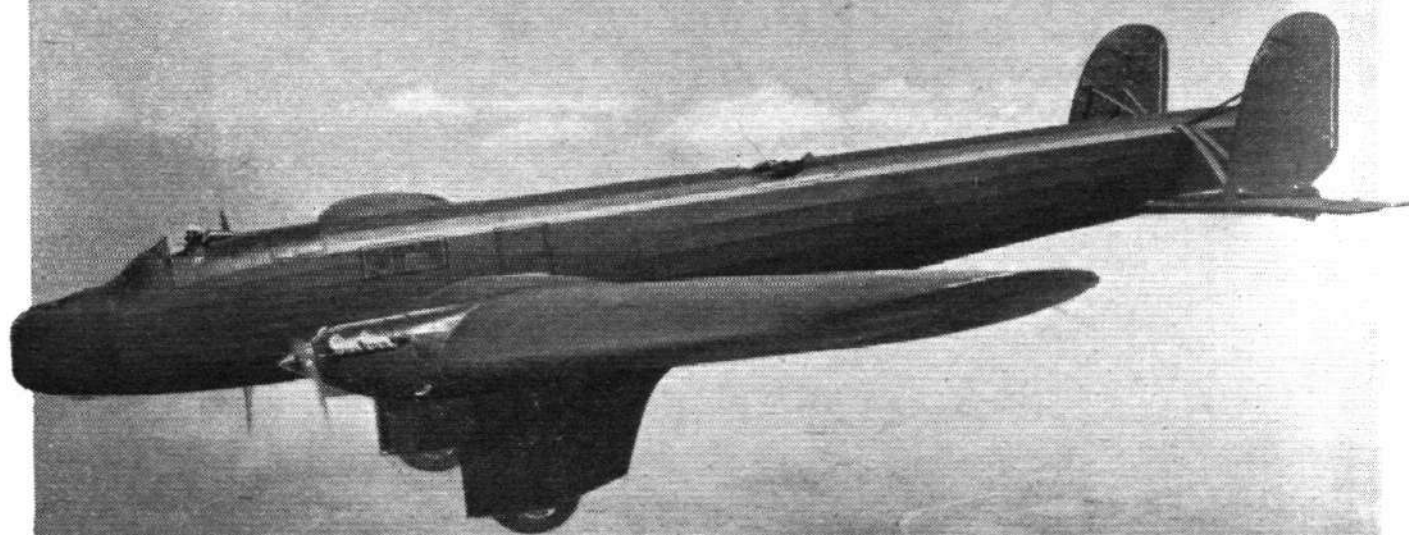
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## Defence

THIS year the interest aroused by the Air Estimates has been largely overshadowed by the "Statement Relating to Defence" issued over the initials of the Prime Minister, who is also chairman of the Committee of Imperial Defence. Rarely has such a clear statement on defence problems been set forth by any Government. Certain principles are laid down which should do much to still the tendency to squabble that is sometimes shown by exponents of one or another fighting service. We would draw particular attention to the following pronouncements, which, though almost every one of them has been challenged by loose thinkers, really permit of no serious dispute when set forth as they are in this classical document. First, Mr. MacDonald says that "If peace should be broken the Navy is, as always, the first line of defence for the maintenance of our essential sea communications." This reads almost like a platitudinous truism, but none the less it has become desirable to make the statement with the authority of the Government behind it. It is expanded by a later paragraph which explains that "Developments in the power and range of air forces have increased the vulnerability of this country. . . . The growing power of air forces, however it may have changed other conditions of warfare, has still left our merchant ships on the vast ocean spaces as open to naval attack as before. The necessities of naval defence remain, therefore, unaltered."

As a paper devoted to flying, *Flight* can claim no authority to discuss the dictum that "In the Main Fleet the capital ship remains the essential element upon which the whole structure of our naval strategy depends." It is, however, of interest to every taxpayer, and we therefore draw attention to it for the benefit of our readers. The other Services, that is the Army and the Air Force, are required to co-operate with the Navy in the defence of ports and of the narrow seas, for the safeguarding of our food supplies. It is useful that this function of the Air Force should be authoritatively put

on record. It is likewise satisfactory to read that "It is equally essential that our fleet should be kept up to date in all respects, including . . . adequate provision of aircraft (which are becoming more and more important to the Navy)." This has a direct application to the increases in the Fleet Air Arm.

Turning from the general to the particular subject in which *Flight* is mainly interested, it is of great importance to see it laid down that "The Royal Air Force has, as its principal rôle, to provide (with the co-operation of ground defences) for the protection of the United Kingdom, and particularly London, against air attack." This principle has often been stated in *Flight*, and it has now received authoritative sanction. The Prime Minister follows up this saying by remarking on the technical development of military aircraft and the consequent increased importance of the integrity of territories on the other side of the Channel and the North Sea. He repeats, by implication, Mr. Baldwin's saying that "our frontier is the Rhine."

Not the last trenchant remark in the whole statement is another truism which is too often overlooked: "Ineffective defence means not only waste but defeat."

## The Air Estimates

EVERYONE needs to bear the words of the Prime Minister's statement in mind when considering the details of the Air Estimates. Most of the main details have now been published and discussed. The net estimate is for £20,650,000, which is an increase of £3,089,000 on last year's figures. The Air Force is the only one of the fighting services in which there is to be an outstanding increase in units and personnel during this year. The expansion programme was announced last July, and it provides for the addition of a total of 41½ squadrons by the end of 1938, which will bring the total first-line strength of the regular Air Force up to about 1,330 aircraft, to which may be added some 130 machines in non-regular squadrons. This adding up of totals is misleading, for



the functions of the Air Force are so many and so diverse that a mere counting of heads means little. The Fleet Air Arm, for example, is part of the Fleet. The principal rôle of the Air Force, as we have said, is the air defence of the United Kingdom, and air power, when compared with that of a Continental nation, should be considered only in terms of our Home Defence Force.

The Memorandum accompanying the Estimates reminds us that four of the 41½ squadrons were formed in 1934 (only one fighter and one light bomber squadron being added to the Home Defence Force) while a further 25 squadrons are to be added in the years 1935 and 1936. It is, however, satisfactory to note once again that during 1935 eleven new squadrons will be added to the Home Defence Force, which will then comprise fifty-four squadrons. This, nevertheless, is only two squadrons more than the total laid down as necessary in the 1923 programme. The increase is not extraordinary, but the great thing is that leeway is now being made up. The programme is stated to be elastic, so that it can be retarded or accelerated in accordance with the needs of the international situation. We must hope that there will be no reason for accelerating it, for work done in haste is rarely the best work. Still, in view of the Prime Minister's warning words to Germany and the impending visit of Sir John Simon to Berlin, it is well that the Germans should know that Britain has not reached the limits of her power of expansion.

The amount to be spent by the Admiralty on the Fleet Air Arm in 1935 is £1,873,000, which is an increase on last year's figures of £535,000. As a net result for this expenditure of half a million pounds the Fleet Air Arm will be increased during the present year by nineteen first-line aircraft. This does not seem a very large increase for the sum spent, but, of course, the whole of the money will not go upon machines and engines. In view of the Prime Minister's remarks about the growing importance of aircraft to the Fleet, it is surprising that a larger increase has not been required by the Admiralty. It should be remembered that the size of this Arm is settled by the Admiralty, and the Air Ministry supplies the machines that are required.

The Army in the United Kingdom will continue to be catered for by five air squadrons as hitherto. Here again, if the War Office were to press for more squadrons the Air Ministry would doubtless provide them, although the War Office does not pay for them and the Air Estimates would be swelled without any addition to air power properly so described. It is a national danger that the Army should have so small an Air Arm, especially when it is remembered that the five squadrons are all designed and trained for co-operation work, which means mainly reconnaissance, and that there are no specialised fighters and bombers set apart for work with the Army. This state of affairs must be altered some time, and it will not be wise to delay the reform too long.



**UP-TO-THE-MINUTE :** Modern commercial monoplane practice is exemplified in every line of the new Avro 652, two of which have been built for charter work for Imperial Airways. The machine, which has two Siddeley "Cheetah" engines, is described in this issue. (*Flight* photograph.)

# The Outlook

## A Running Commentary on Air Topics

### Rudder Bar or Stick?

IN view of the interest in the "Pou-du-Ciel" which, as was pointed out in an "Outlook" paragraph last week, uses a rudder as the primary control, it is interesting to learn that two designers of our light aeroplanes have both come to the conclusion that there is a great deal in favour of teaching people to fly in a machine which does not need the use of the rudder. It will be remembered that this characteristic was mentioned in our description of the Miles "Falcon," wherein the stability and the proportioning of the fin surfaces is such that all normal turns can be made without touching the rudder bar. The same can apparently be said of the D.H. "Hornet Moth," the first production model of which will, it is hoped, be flying before very long.

Captain De Havilland, like Mr. Miles, also sets great store by these characteristics, and feels that pupils will in the future best be taught by being allowed to use the rudder only after they have become proficient without it. It will be interesting to see which school of thought makes most headway.

Aerodynamically, it is easy to postulate credible theories in favour of both schools, but, perhaps, it is worth while remembering that a bird has no rudder, and, so to speak, primarily makes use of ailerons and elevator. However, it has never yet really been conclusively shown that the aerodynamics of bird flight can profitably be followed closely for the design of power-driven aircraft.

### Wheel Landings

LOGICALLY enough, the good old three-pointer, which has always been considered to be the perfect method of making contact with the earth, is giving way to the wheel landing. If a machine is heavily loaded the pilot naturally feels that the undercarriage should take the brunt of any impact. If, on the other hand, a machine is lightly loaded and a strong wind is blowing, he usually prefers to fly it on to the ground.

As aerodrome surfaces improve still further, the three-point landing will go the way of warping wings—with a consequent decrease in the number of broken tail skid springs and tail wheel fittings. Even the somewhat sensitive and lightly loaded primary training biplane can be placed firmly yet gently on its wheels if the aerodrome surface is sufficiently smooth, though a ridge will set it flying again, with results that are not always pretty. Certainly one sees no reason why the tail wheel should be expected to take a third, or even more, of the landing loads.

### Flying Boat Design

TWO American manufacturers have recently built, to a specification of Pan American Airways, flying boats of which the ratio of gross weight to tare weight is far better than anything yet achieved for similar craft. The result has been an orgy of comparison with the boats of other nations.

We question whether there is any fair basis upon which such comparison can be made. These two types were designed to fill the requirements of a certain operator who wanted them for a specific job, and they cannot be compared with boats built for other purposes. In considering the gross-tare weight ratio of these boats as compared with that of our own boats, it should be remembered that the Air Ministry requirements in this country appear to be

based, for the most part, upon military boat practice. For military use boats must be capable of being operated in bad weather, of working from unsheltered harbours, and of being sent to places where there is little or no service available. They must, therefore, be robustly built and have a large reserve of buoyancy. Boats for commercial purposes operate to and from selected waters, and, generally speaking, do not have to land anywhere except at those harbours. They can, therefore, be more lightly constructed with a consequent increase in the load they can carry and without in any way impairing their airworthiness. Military boats must have four watertight bulkheads—another factor which increases the structure weight to the detriment of the load, and is of doubtful commercial value.

We of *Flight* have never adopted the "away-with-all-Air-Ministry-control" attitude, but in this case, as in some others, we would like to see that control take more obviously into consideration the use for which the aircraft are to be built, and to be bound somewhat less by the results of past military practice.

### Convenience

IF, before the production of a new type, the private pilots in this country were asked their opinions about certain minor points concerning cockpit and instrumental features, the designer, torn between a thousand and one suggestions, would probably be more disturbed than he is at present. Nevertheless, there are certain points which are sorely in need of attention.

At present, more often than not, the compass is placed where there happens to be some space, and a shelf, for such oddments as maps and gloves, may or may not be fitted if the design permits. A compass placed on the floor and in front of the control column can be more or less invisible under just those conditions when accurate navigation is most necessary. All compasses should, if of the more normal type, be placed much nearer eye level and in continuous view, without too great a change of ocular focus.

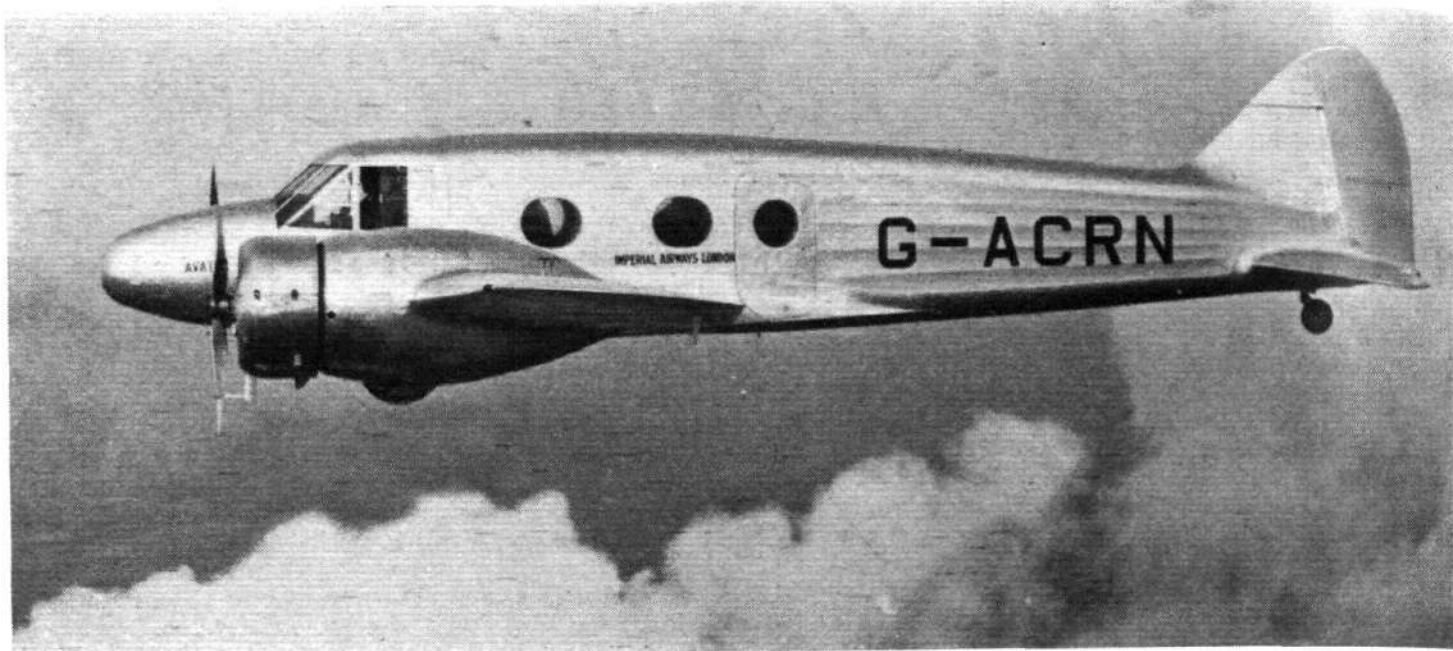
Every machine should have some form of map holder as a part of the ordinary equipment. Normally, the unfortunate pilot places his map in his bosom for the take-off, unfurls it gingerly with one hand while getting on his course, and continues to hold it while adjusting the throttle and the trimming gear, and while, perhaps, pumping petrol into the gravity tank. If he drops it the whole thing rips down the fuselage—and a map, however good, lying somewhere near the tail, is of no great assistance.

Shelves should be fitted either with a deep ledge or with light clips. It is the most disconcerting and even dangerous thing to receive a lapful of maps and gloves just at the moment when the tail is well up and the machine is almost airborne.

### "H" Engines

THE recent news that the Air Ministry have ordered sufficient Napier "Dagger" engines to equip one squadron of the R.A.F. is satisfactory. All avenues should be explored to obtain the best performance out of Service aircraft, and it would be wrong to disregard the possibilities of the "H"-shaped air-cooled engine; the chief advantage which it offers is small frontal area, combined with the absence of water-cooling complications. It is understood that the "Dagger" will find its place in a squadron of Hawker "Audaxes."





## FOR IMPERIAL AIRWAYS CHARTERS

*Two Avro 652 Low-wing Monoplanes With Siddeley "Cheetah" Engines :  
Finely Finished Passenger Accommodation*

WITH the exception of Imperial Airways, Ltd., practically all the air-line companies operating at Croydon have several low-wing monoplanes among their fleets. Now, Imperial Airways will cease to be an exception, for their latest acquisitions are two Avro 652 low-wing, twin-engined monoplanes, which are to be called *Avatar* and *Avalon*. It is understood that they will be used primarily for long-distance charter work.

As will be seen from our table of performance figures on the next page, they should be eminently suitable for this purpose; even with "Cheetah V" engines their cruising speed is about 150 m.p.h., while with "Cheetah VI" engines, which will be fitted to subsequent models, this speed will be increased to at least 165 m.p.h.

A head-on view of the 652 shows that the makers have studied the question of interference very carefully, and have evolved a particularly clean and well streamlined layout. The engines are cowled-in completely with ring-type cowlings, having a double surface in keeping with the usual Avro and Armstrong Siddeley practice. Behind these cowlings a large tapering "egg" forms the fairing, which merges into the top and bottom surface of the wing. The top half of this fairing carries the oil tank, and the bottom half houses the retractable undercarriage. The alu-

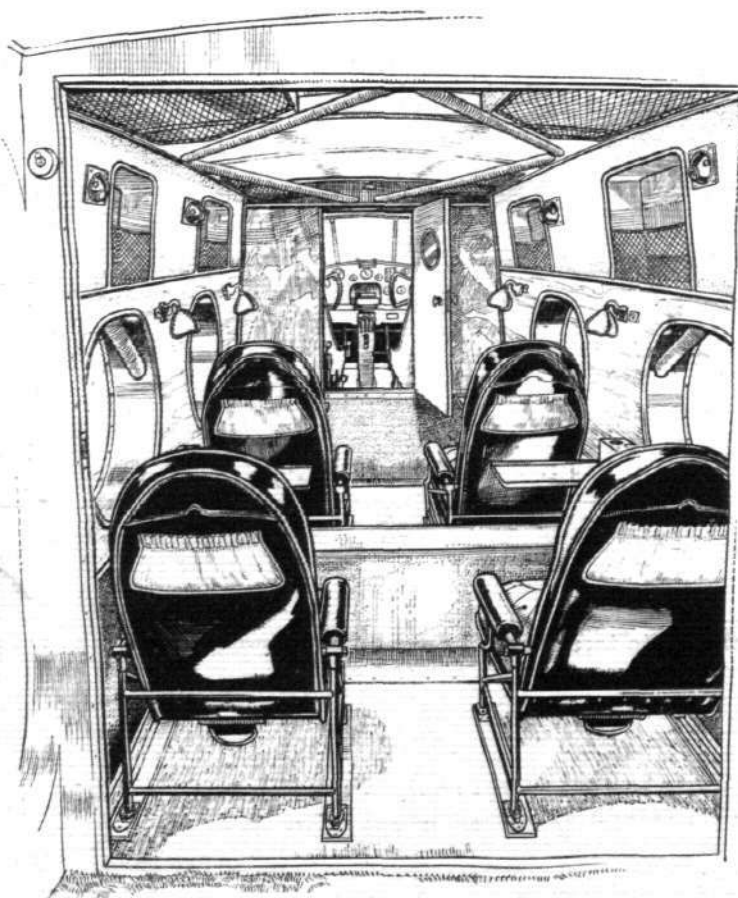
minium fuel tanks are on each wing, outside the engines.

Structurally, the 652 follows the lines of other Avro commercial machines. The rectangular fuselage is built of welded steel tubes, and has the corners carefully rounded off by plywood bent to a large radius, and spruce stringers running the length of each side carry doped fabric. The wing and tail units are all of plywood and spruce construction with plywood covering, so that the combina-

tion forms a rigid structure which should require very little maintenance.

The tail plane is fixed, and merges into the fuselage with generously dimensioned fillets, as does the fin. Both fore and aft and directional trim are achieved by "tabs" on the elevators and rudder. These are worked from small serrated knobs situated above the pilot, and in flight they are sensitive and easy to operate. The ailerons are of the narrow cord and long span type, and are Frise-balanced.

The cabin accommodation, as arranged for Imperial Airways, has been very tastefully done in blue and buff by L. A. Rumbold and Co., Ltd., with a generous use of figured wood panelling for the sides, between which and the fabric covering of the fuselage there is a sound-damping layer of Seapak, a seaweed substance which, between layers of brown paper, is very effective for deadening noise.



The interior of the cabin of the Avro 652, as arranged for Imperial Airways. The walls are wood-panelled.



# CONFIDENCE



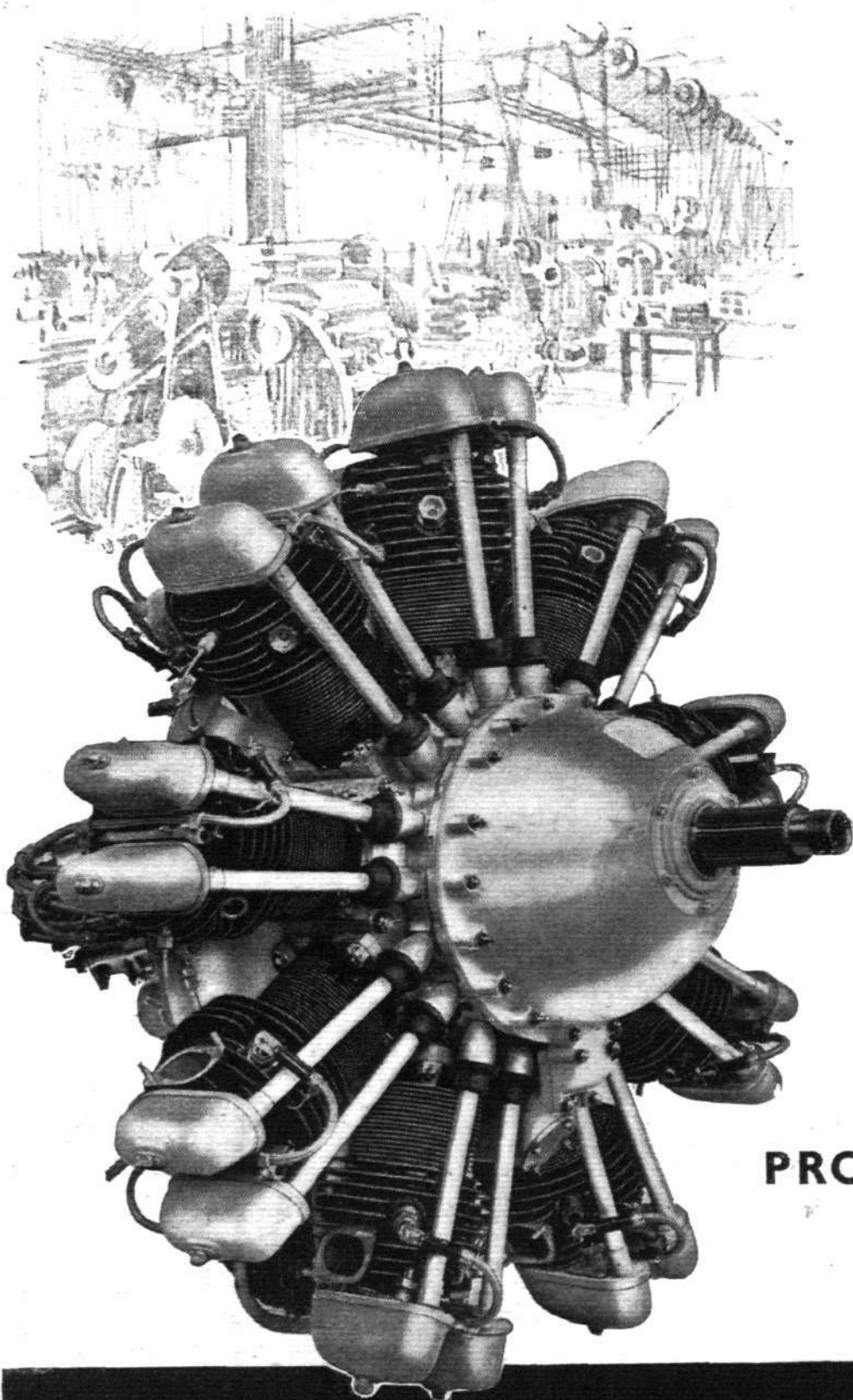
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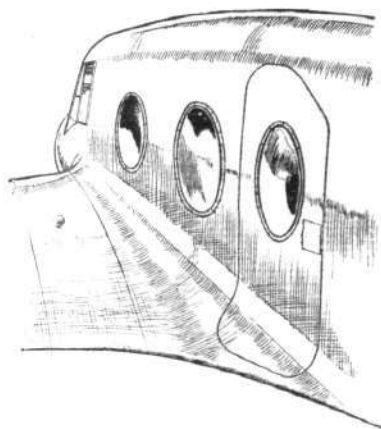


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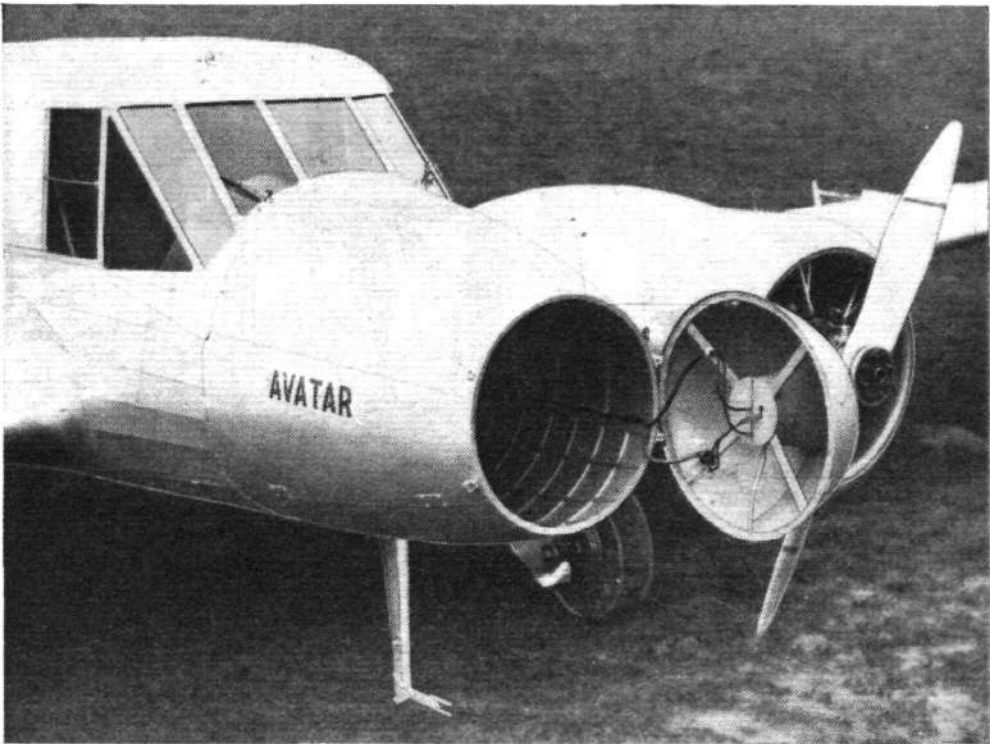
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(Above) The cabin door of the Avro 652 is shaped to the wing-root fairing.

(Right) Mails or other light loads can be placed inside the nose through this door. For Imperial Airways a landing light has been fitted in the nose. (Flight photograph.)



AVRO TYPE 652

Two Siddeley "Cheetah" Mk. VI Engines of 290 h.p. at 2,100 r.p.m. at 6,000 ft. (1 829 m)

Dimensions.

	ft.	in.	m
Span of wing	56	6	(17,22)
Span of tail plane	16	0	( 4,88)
Height overall	9	6	( 2,89)
Length overall	42	3	(12,88)
Wheel track	13	8	( 4,16)
Dihedral angle	4 deg.		
Aerofoil : Incidence	0 deg.		
Section	Avro Type 652		

Areas.

	sq. ft.	m <sup>2</sup>
Main planes, with ailerons	410	(38,09)
Ailerons	39.8	( 3,69)
Tail plane	41.9	( 3,89)
Elevators	21.5	( 2,00)
Rudder	20	( 1,86)
Fin	9.5	( 0,88)

Performance Weights and Loadings.

	m.p.h.	km/h
Max. speed at sea level	175	(281,6)
Max. speed at 6,000 ft. (1 829 m)	195	(313,8)
Minimum flying speed	60	( 96,5)
Cruising speed at 6,000 ft. (1 829 m)	165	(265,5)
Duration at cruising speed	4.8 hr.	
Climb at sea level	950 ft./min. (4,82 m/sec)	
Climb to 10,000 ft. (3 048 m)	11.7 min.	
Service ceiling	21,500 ft. (6 553 m)	
Absolute ceiling on one engine	6,000 ft. (1 829 m)	
Wing loading	18.3 lb./sq. ft. (89,34 kg/m <sup>2</sup> )	
Engine loading (rated power)	12.9 lb./B.H.P. (5,85 kg/hp)	
Take-off	200 yd. (182,8 m)	
Landing run, using brakes	250 yd. (228,6 m)	

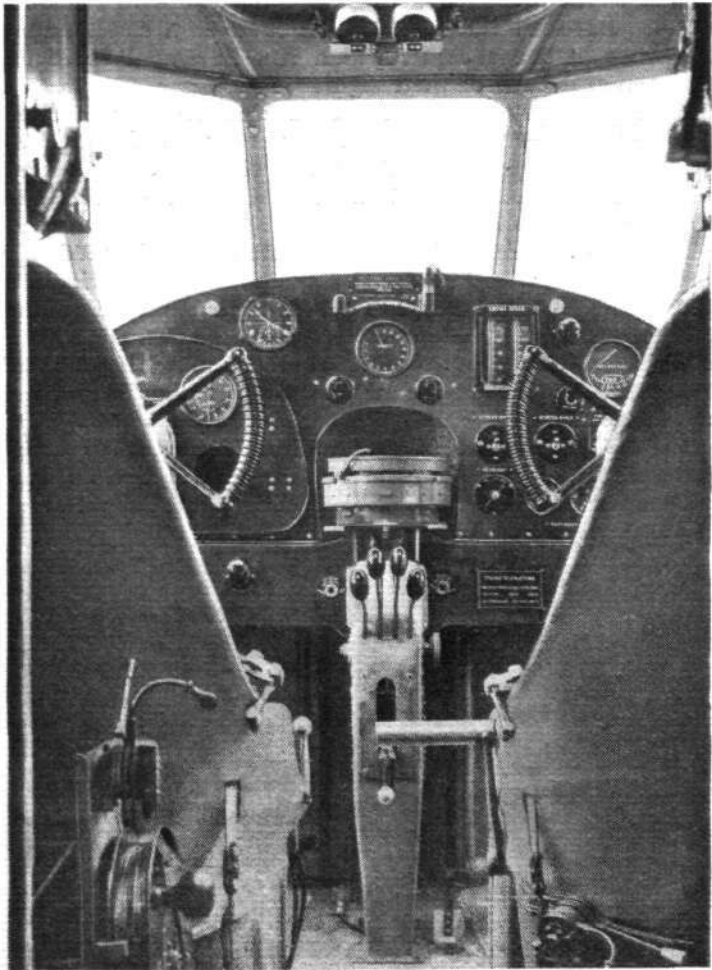
Weight and Performance with Various Numbers of Passengers at Cruising Speed.

	lb.	kg.
Tare weight (simply furnished), 6 seats	5,100	(2 313,3)
Fixed load.		
Pilot	170	(77,1)
Plessey W/T	65	(29,5)
Miscellaneous	35	(15,9)
Disposable load	270	( 122,5)
	2,130	( 966,1)
Gross weight	7,500	(3 401,9)

No. of passengers.	Range	Duration. hr.	Extra disposable load.	Weight of pass. and baggage.
	mi (km)		lb. (kg)	lb. (kg)
4	787 (1 267)	4.79	314 (142)	800 (363)
5	787 (1 267)	4.79	102 ( 46)	1,000 (454)
6	702 (1 130)	4.27	nil	1,200 (544)
7	537 (864)	3.28	nil	1,400 (635)
8	374 (602)	2.27	nil	1,600 (726)

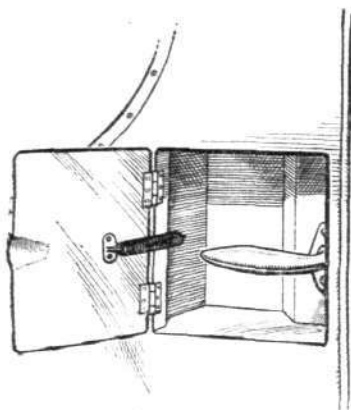
Electric starters for the engines, and electric lighting and landing lights may be fitted, if allowance is made on payload and/or range.

There is accommodation for four passengers on seats of the adjustable type, in which a reclining position is possible. Each passenger has a small table, a fiddle for carrying glasses, a reading lamp, and an individual fresh-air supply, while alongside each of the two front passengers are controls for a hot-air supply. In the rear end of the cabin there is a wash place and lavatory, while abaft that again with an external door on the starboard side of the machine (the main cabin door is on the port side) there is the luggage compartment. Further luggage

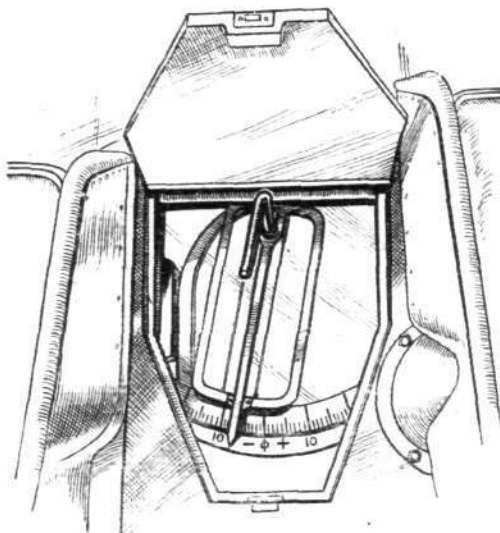
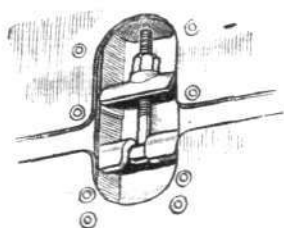


Full dual flying controls are provided in the pilots' cockpit. (Flight photograph.)

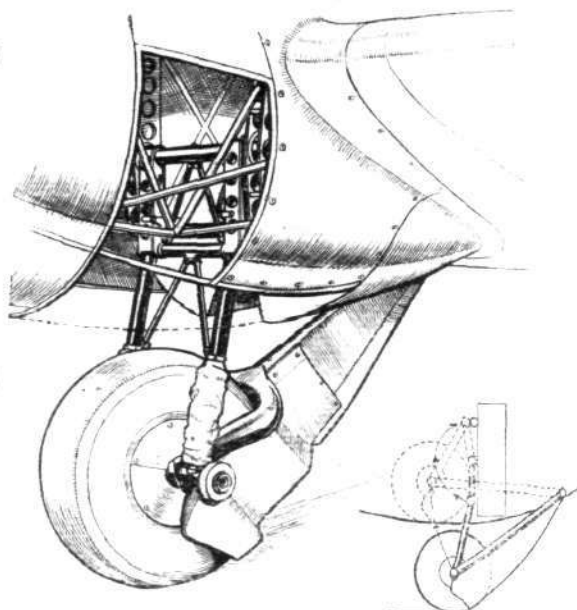




A spring lid covers the cabin door handle, leaving a clean exterior.



(Above) This drift sight is in the floor of the Avro 652, between the pilots' seats. (Left) Two screw clips hold each side of the engine cowling and allow it to be readily detached. (Right) This sketch and diagram explain the working of the retractable undercarriage, which is underneath the engine mounting.



flat, even with the undercarriage down, and it would seem that the addition of some form of air brake to steepen the angle of glide is likely to be considered desirable by most pilots, particularly if, as is generally the case in the course of charter flights, the machine has to be landed in confined aerodromes with high obstructions around the boundaries. Steepening the glide is always preferable, from the passengers' point of view, to side-slipping

or mails can be carried in the nose of the machine in front of the pilots. This is a separate riveted duralumin shell, with a hinged nose door which, incidentally, also carries a Harley landing light.

The pilots' cockpit is very fully equipped, with two side-by-side seats and a full set of dual controls. The dashboard has an extensive layout of instruments, including those for both engines. Behind the pilots, on the bulkhead which separates them from the passenger cabin, and in which there is a door, is the Marconi wireless equipment. Between the pilots' seats there is a small flap in the floor of the cockpit, which can be raised to expose an open-grid type of drift sight.

Electric starters, which can be worked from the cockpit, are fitted to each engine. The windscreen has a very pronounced slope, and the sides of the cockpit have windows of ample proportion so that either pilot can see out with great ease.

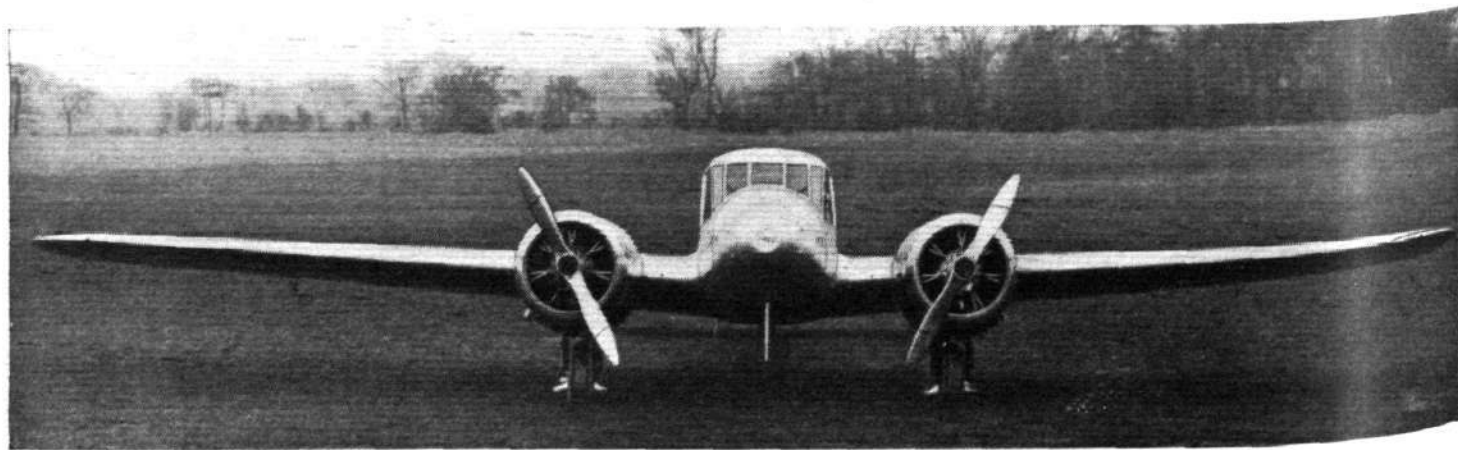
The retractable undercarriage fitted to this model is, as can best be seen from the sketch, of the articulated type, with the wheel raised forward and upward so that it projects slightly underneath the engine cowling when in the "fully-up" position. It is operated by a screw gear of rather low pitch, actuated by a handle between the pilots' seats.

In the air the 652 is easy to fly, having those amply proportioned, effective controls for which Avro's have become so well known. The gliding angle is extremely



The auxiliary surfaces for trimming the elevators and the rudder can be seen in this photograph of the tail units. (Flight photograph.)

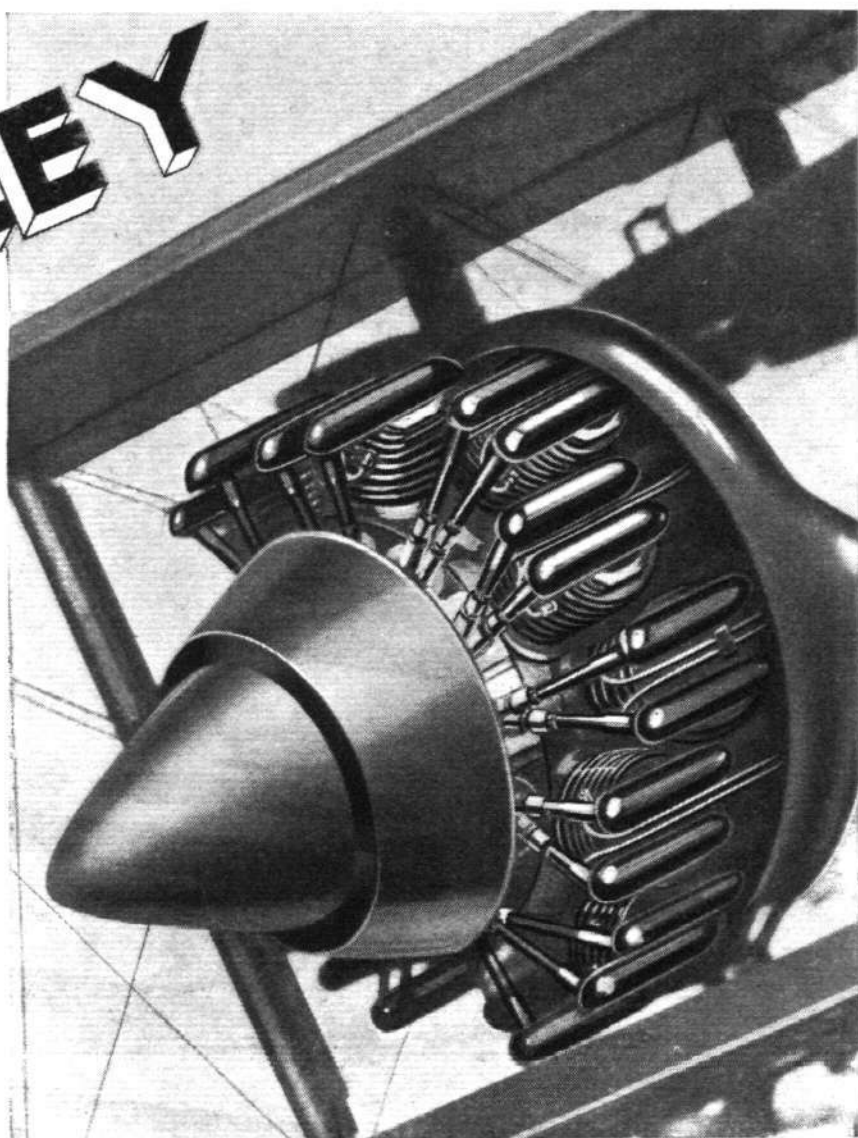
as a method of losing height quickly, because any prolonged deviation from the horizontal tends to make them think that there is something wrong.



Head on, the Avro 652 looks clean and carefully faired. (Flight photograph.)

# SIDDELEY

## AIRCOOLED RADIAL ENGINES



## FACTS AND FIGURES

An Italian air transport operates over the Alps with six planes, each of which is fitted with 3 Siddeley "Lynx" 215 h.p. engines. 2,000,000 kilometres have been flown without any mishap. The engines have run 33,575 hours—equivalent to 1,343 hours per engine—and the planes have carried 20,000 passengers and 350 tons of mails and cargo. Jaguar 400 h.p. engines which are fitted in five Imperial Airways A.W. "Argosys" have exceeded 10,480,000 engine miles in Europe and North Africa. The eight "Atalantas" fitted with 4 "Serval" 240 h.p. engines, have flown over 2,815,000 engine miles in South Africa and India. In Europe and the Near East, "Lynx" engines in two Avro Ten planes have flown 1,242,000 engine-miles, and "Genet Major" engines in three Westland "Wessex" planes have flown 713,700 engine-miles. All these performances have been accomplished with low fuel consumption and low maintenance and repair costs.

ARMSTRONG SIDDELEY MOTORS LTD., COVENTRY, ENGLAND

AS 96



*Extract from Memorandum accompanying Air Estimates 1934 :—*

"Coupled with such developments as the longer life of metal machines, and the extension of period between overhauls of both engines and aircraft, the necessary equipment for the new formations is being provided without any appreciable increase in the net amount of the vote."

The illustration above depicts a Squadron of Hawker aircraft—the machines which set a new standard.

Adv.



# MOUNTAINEERING by MONOPLANE

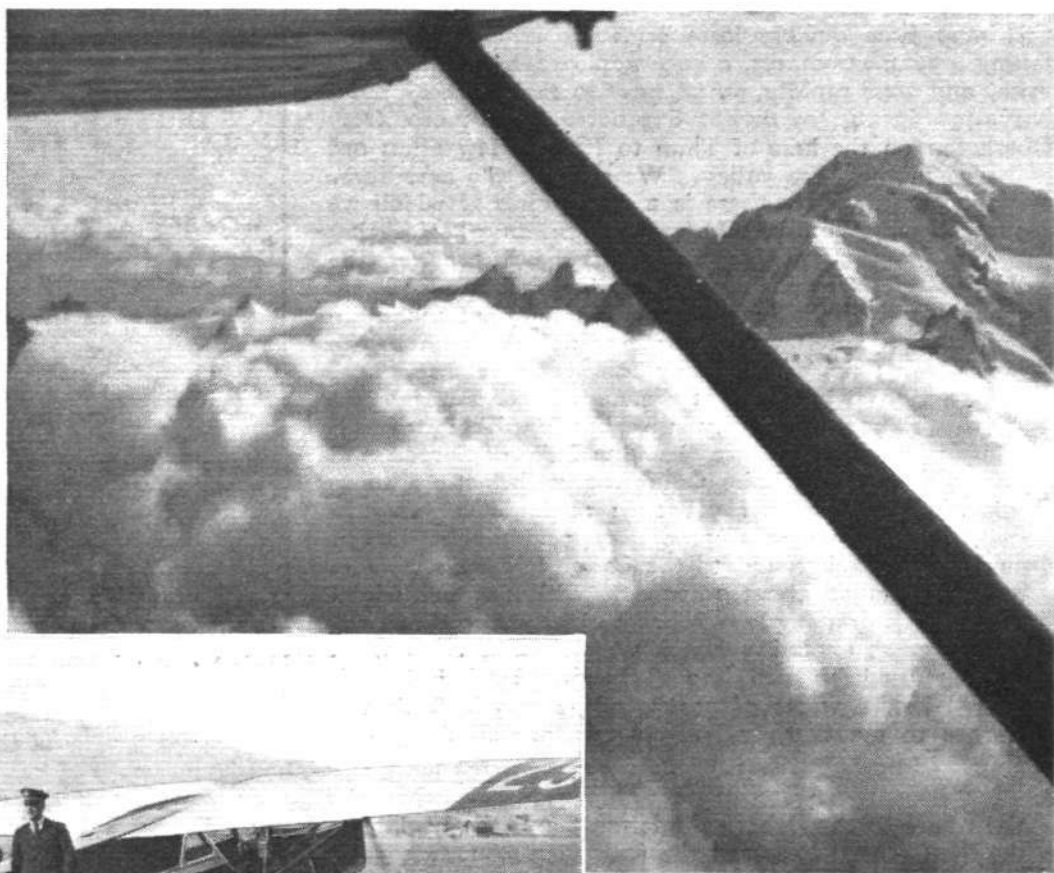
*The Alps from the Air : An Account of a Flight from Berne to Venice and Back*

By DOUGLAS FAWCETT

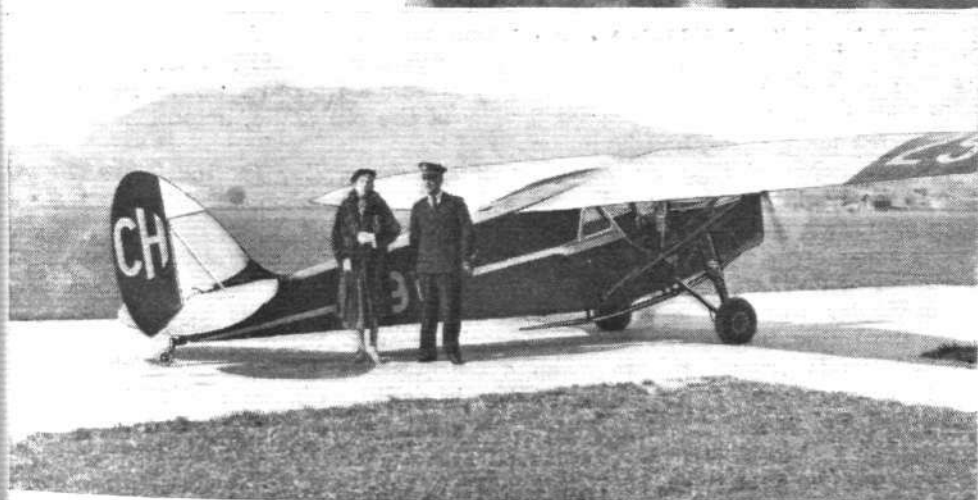
This article on Alpine flying is remarkable in that the author, Mr. Douglas Fawcett, became a pilot last August at the age of sixty-eight. He has lived among the Swiss Alps for the greater part of twenty-five years, and is an expert mountaineer; in 1909, by special permit, he opened up most of the Valaisan high routes to motoring, and still holds some "altitude records" for cars.

In 1893 he wrote a novel in which he forecast with extraordinary accuracy the modern type of war aeroplane. Now his youthful visions have become realities, and he himself pilots aeroplanes above the mountains he loves.

Recently he took a "Leopard Moth" up to 17,300 ft. accompanied by the passenger mentioned in this article, a lady as youthful as himself in spirit, though almost his rival in years.



(Above) Mt. Blanc (15,780 ft.) towering above a sea of clouds — a photograph by the author.



(Left) The "Leopard Moth," on the aerodrome at Belp, with Mr. Fawcett's companion and Herr W. Eberschweiler.

HAVING explored, and flown over, almost all the higher mountains of Switzerland and Savoy, having twice seen below us Mt. Blanc and thrice Mt. Rosa, the Dorn and the Matterhorn, my friend and myself began to sigh for fresh peaks to conquer. Staying awhile at Oberhofen, on the lake of Thun, in the very heart of Swiss beauty, we desired a flight which would blend the picturesque and the adventurous in the most pleasing way possible. We hit on the idea of a trip from Berne to Venice, our course lying not over low and short passes like the Simplon but over the most mountainous regions available.

Not having a British "bus" in Switzerland, we had to conform to the rules governing Swiss aviation. As an "A" pilot, entitled to hold the Swiss brevet Category I, I am free to disport myself on a Swiss-registered machine. I may not, however, take a passenger until twenty hours' work on Swiss aerodromes and certain tests have qualified me to hold brevet Category II. It was late in the autumn, and delay, in view of weather conditions in the high Alps, was not to be thought of. So we arranged with the well-known Swiss expert, Willy Eberschweiler, to take us in a "Leopard Moth," whose "Gipsy Major" could be relied on where landings would be impracticable.

A word on aviation in Switzerland. Those who fly in the lower and wider valleys or in open country over hospitable fields such as are to be found, for example, between Geneva, Neuchatel and Berne will be nearly as safe as in most of England or the plains of France. Those who fly in upland valleys or over certain ranges of mountains, such as that in the heart of which lies Zermatt, must go warily. Landing places may be lacking. They must take very careful note of mist, cloud and the weather generally. They must avoid flying when the Foehn is blowing strong or even when it is expected to blow. This wind carries the craft down with it; in September, 1933, flying in a 240 h.p. "Jungfrau" single-engined machine, we noted a fall of over 650 ft. beside Mt. Blanc, although this south wind was not in violent mood. It is much safer to fly above the mountains than among them. Eberschweiler told me that he was once carried 1,800 metres above the Matterhorn by a violent current. The descending currents are even less enjoyable! Those who like high flying are secure, and they have a wonderful outlook above the high Alps on a fine day. We are not young people, but at 17,300 ft. above the Rhône valley last September we found we experienced no discomfort whatever, and found Italy, Switzerland and Savoy richly represented in the field of

view; every one of the great peaks could be seen by an ex-mountaineer quick to identify old friends.

I was prepared to enjoy navigation work during our flight to Venice, and I may say at once that I did not consider it difficult, for on a fine day it is easy to steer a true course over mountainous country like Switzerland and the Tyrol. The vastness of the great natural features, valley-systems, rivers, mountain-ranges, lakes and so forth renders interpretation of the map easy. In North Italy the lakes are of great use on a west-east or east-west course, as we shall see later. So far, so good; but if visibility becomes bad this map-game quickly loses its value and charm, and, failing a compass course, a very unpleasant situation may arise, and that rapidly. And now to make use of notes harvested during the flight: October 22: we motor from Oberhofen on the lake of Thun to Belp, a few miles out of Berne in the Aare valley. We stop at the aerodrome of Alpar Bern, where there is a flying club of which we are members. We take off at 10.40 a.m. on a perfect day and turn not towards the lake of Thun but across the Aare and out of its valley towards the Brienser-Rothorn, rising for miles continuously. As we top that mountain (with its high hotel) we have a fine downlook on to the greenish-blue Lake of Brienz and the town of that name, and once more catch sight of the Aare River showing like a bright ribbon far away up the Haslithal towards Meiringen. On our left are the blue Lake of Sarnen and the Statten See of the Lake of Lucerne, with just a glimpse of distant Lucerne itself veiled in mist. The Jungfrau massif, the Wetterhorn, Schreckhorn, and Finsteraarhorn form a grand background to the Lake of Brienz.

We are soon at about 10,000 ft. with our old friend Titlis Mountain on our left—we were just above his cloud-wreathed crags exploring last May. Beneath us is what Norsemen used to call the "Hundred-headed Grandmother," i.e., a waste of peaks, ridges and icefields too numerous to mention, and always we are climbing.

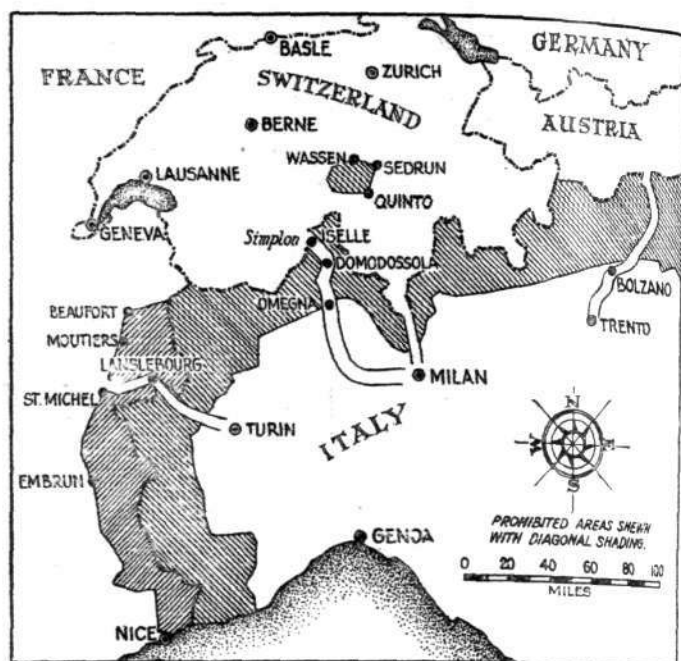
### The Italian Frontier

Ah! there to the right is Andermatt and the beginning of the St. Gothard Pass; all the valley is under snow save a patch of green near Andermatt. We are soon crossing the Oberalp Pass and can sight, in the canton of Grisons, Disentis and the still green valley of the Vorder Rhine. We are now at about 14,000 ft., and can see the Lukmanier Pass, familiar in my motoring tours, which leads from Disentis down to the canton Ticino and Bellinzona.

We seem hardly moving above a world of ice-giants, though travelling, in fact, at over 100 m.p.h. At 14,600 ft. we are looking down on the Bernardino and Splügen Passes; we can see Splügen village and the Italian custom-house clearly. Anon we follow the line traced by the Julier Pass, cross the Engadine, and swing to the left above the high mountains bounding that valley. At 15,300 ft. we pass over the Bernina and Piz Palu, respectively 13,295 and 12,830 ft. high, both very near the Italo-Swiss frontier.

But neither here nor at any near point are we allowed to cross that frontier. Prohibited areas! Examine the map and you will note the extent to which this abuse of "state rights" has been pressed. Flying out of Switzerland into Italy, one may use the Simplon and Chiasso corridors; ignoring these, one must pass to Austrian Innsbruck and reach Italian Bolzano and Trento by the Brenner Pass and Adige valley. On the French-Italian frontier French and Italians combine to exclude the tourist from the Alps; he has to make use of the narrow corridor, St. Michel de Maurienne-Turin. 'Tis a mad world, my masters! How long shall we have to wait for that federation of European States which will end this barbaric nonsense? Cameras, again, while permitted in Switzerland, are not to be used in France and Italy; and this is the reason why I have to omit adequate illustration of this article.

But to continue: we may not reduce our mileage at this point by making for the Stelvio Pass and thence to Merano, nor may we descend to Lake Como by the Val-



The prohibited area mentioned by the author of this article. Note the four narrow "corridors."

tellina; so we keep a course more or less parallel to the lie of the Engadine valley, noting St. Moritz, Celerina, Samaden, Zuoz and Zernez as we go. At the highest point reached in this flight (15,600 ft.) we are over the Ofen Pass, and very soon after cross the Val Venosta. Leaving Martinsbruck (Swiss frontier) on our left, we cut across mountain masses till we perceive, having dropped to 15,000 ft., a vision of extreme beauty—Innsbruck in the Valley of the Inn. We spiral down to about 2,000 ft. over the town (which is some 1,800 ft. above sea-level) and enjoy a good view of the old castle, aerodrome and neighbourhood.

Then we leave the Inn valley for the famous Brenner Pass, hardly 5,000 ft. high, through which we are to descend into Italy. To the left, bare, fantastically shaped Dolomite peaks are to be seen. We cross and are above a superb valley which at Bolzano joins another valley leading from Merano which connects with the Ofen Pass. We are now in the Upper Adige valley, and remain so till we reach Trento, where a descent is made in search of petrol. There is none! We take off from the rough-surfaced aerodrome in some doubt as to whether we shall reach Venice in one hop. We climb out of the valley across high rolling uplands eastward, and in half an hour the Venetian plain is below us; we note the rivers Brenta and Piave and the town of Treviso; behind the Piave the Dolomites show clearly. On this monotonously chequered plain the landing possibilities seem few and bad. And now mudflats—the lagoon—the railway causeway and Venice!

### A Deserted Lido

We float over the city, enjoying a wonderful view of the canals, and head for the Lido, making a circuit over the now deserted bathing huts and the training-ship *Scilla*, and lo! the aerodrome! We touch grass after a 45-minute flight from Trento, having covered 630 kilometres in all since we left Belp. Formalities settled, we leave in a steamer for the Hotel Danieli, Venice. A very picturesque journey closes well with my first visit to this unique city.

We leave Venice at 1.50 p.m. next day, circling high above the aerodrome before crossing the lagoon. Visibility is not good—clouds and mist are worsening. We rise to about 9,000 ft. over the mainland, after passing over Padua and Vicenza, as lines of ragged ridges lie ahead. We cross the deep Adige valley and Lake Garda near its head, then lakes Idro and Iseo. The mountains to the north still show clearly, but visibility to the south and south-west is poor.



Next we cross Lake Como, looking down through holes in cloud on to Bellagio; the mountain barrier here is over 8,500 ft. high. Our next lake is that of Lugano, above which we enjoy some circling, and anon, leaving Bellinzona on our right, we begin climbing up the mountain wall that bounds the Leventina, down which valley runs the Ticino River. We leave red-roofed Airolo far below on our right; crossing the St. Gothard Pass (6,900 ft.), a Swiss "prohibited area," is not legal. Accordingly, we have to surmount the main Alpine barrier, to find ourselves anon above the Furka Pass at about 10,500 ft., with

the spectacle of the source of the Rhône to regale us.

We now cross the Grimsel Pass and fly fast down the Haslithal, past Meiringen, over the head of the Lake of Brienz and the crest of the Brienzer Rothorn, and soon arrive at Belp.

We have been two hours forty-eight minutes covering the distance between the Lido and the Berne aerodrome.

The total flight of some 1,100 kilometres is one of the most beautiful to be enjoyed in Europe, but in the case of a single-engined machine the engine must be above reproach!

## A POWERFUL RADIAL

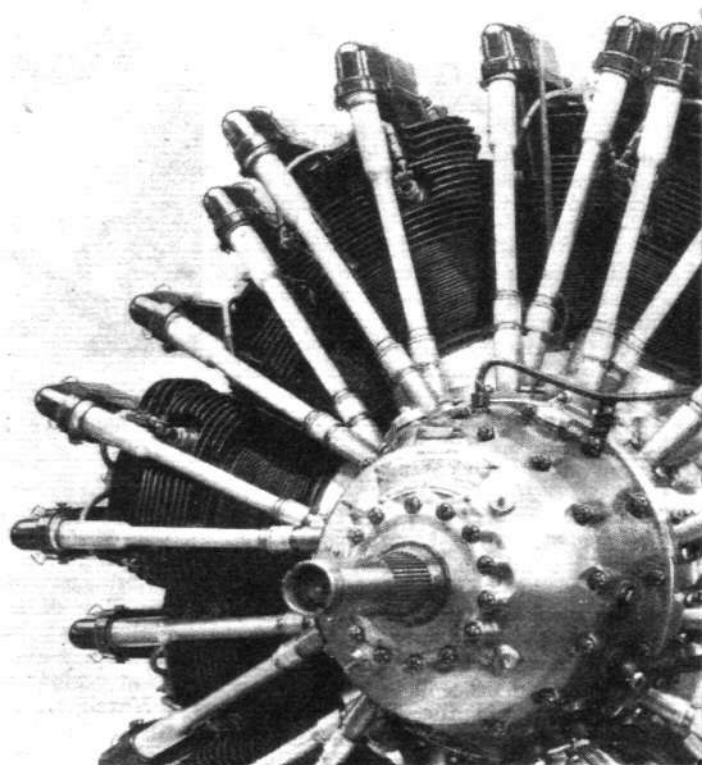
*The Siddeley "Tiger IV" : Normal Power of 700 b.h.p. Developed at 2,150 r.p.m. and 5,000 ft.*

THE latest and most powerful model in the range of aero engines produced by Armstrong Siddeley Motors, Ltd., to be standardised for military aircraft is the "Tiger IV," a fourteen-cylinder double-row air-cooled radial, which, it may be remembered, is the power-plant used in the Blackburn "Shark," a detailed illustrated description of which was published in *Flight* of December 13, 1934.

Like all Siddeley types, the "Tiger" is a radial air-cooled engine, with its fourteen cylinders arranged in two rows of seven, one row behind the other and staggered in relation to it. The crankshaft is of the two-throw type, each crank pin carrying the big end of a master connecting rod, to which are attached the six auxiliary rods.

Of the moderately supercharged type, the "Tiger IV" is designed to give its rated normal power of 700 b.h.p. at an altitude of 5,000 ft. The induction system incorporates a geared fan, the ratio of which is 5.88 to 1. Two alternative airscrew reduction gear ratios are provided, one 0.594 to 1 and the other 0.657 to 1. With a bore of 5.5 in. (139.7 mm.) and a stroke of 6 in. (152.4 mm.), the swept volume is 1,996 cu. in. (32.7 litres).

A maximum power of 744 b.h.p. is developed at 2,450 r.p.m. and 6,000 ft. The weight of the engine, completely equipped, is 1,200 lb. (545 kg.).



Clean external design is a feature of the "Tiger IV"

### A Jubilee Rally

In connection with the Jubilee celebrations, the Royal Aero Club hopes to arrange the biggest rally of civil aircraft yet held. Invitations will be issued to every aircraft manufacturer, air line, school, club and private owner. It is probable that the date will be as close as possible to the Empire Air Day, May 25, and that the rally will be held near London.

### The Greek Revolution

Aircraft of the Greek Air Force have been carrying out active operations against the warships which were seized by the revolutionaries—according to some reports, with effective results—

while the Junkers air liners employed on the Greek air services are being adapted for bombing the rebel forces. As a result of the rebel occupation of Crete, Imperial Airways machines have been diverted, and will fly *via* Castebrosso. The service to Athens is maintained as usual.

### "Mercury," not "Pegasus"

In the notes on the new Bristol day and night fighter monoplane last week it was inadvertently stated that this machine is fitted with the Bristol "Pegasus" engine. The engine is, of course, a Bristol "Mercury," which has a slightly smaller overall diameter and is, therefore, particularly suitable for high-speed military aircraft.

## Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

- Mar. 9. Northampton Aero Club Dinner, Grand Hotel, Northampton.
- Mar. 12. "Future of Air Defence." Debate led by Capt. N. Macmillan, at Women's Engineering Society, 20, Regent St., London.
- Mar. 12. Recent Developments in the Lighting of Airways and Aerodromes." Joint R.Ae.S. and Illuminating Engineering Soc. Lecture, Inst. M.E., Storey's Gate, Westminster.
- Mar. 15. "New Developments of the Autogiro." R.Ae.S. Lecture by Senor Juan de la Cierva.
- Mar. 15. Annual Dinner and Dance. Cinque Ports Flying Club, Royal Pavilion Hotel, Folkestone.
- Mar. 16. Dinner and Dance, Masonic Country and Flying Club.
- Mar. 20. Annual General Meeting, R.A.F. Club.
- Mar. 23. Rugby: R.A.F. v. Army, Twickenham.

- Mar. 29. "Piloting Commercial Aircraft" R.Ae.S. Lecture by Sqn. Ldr. H. G. Brackley.
- Mar. 29. Annual Dinner. Norfolk and Norwich Aero Club, Mousehold Aerodrome.
- Apr. 12. "Commercial Aircraft." R.Ae.S. Lecture by Capt. G. de Havilland.
- May (Date not yet fixed). Wilbur Wright Lecture, R.Ae.S. by Mr. Donald W. Douglas.
- May 29. Household Brigade Flying Club. Night - Flying Demonstration, Heston.
- June. 1. Brooklands "At Home."
- June 15. R.A.F. Flying Club Annual Display, Hatfield Aerodrome.
- June 29. Royal Air Force Display, Hendon.
- Aug. 24-25. Third International Flying Meeting, Lympne.
- Sept. 6-7. King's Cup Air Race.



# THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

## Via Watling Street?

Plans are in hand for a big Italian mass flight over the former Roman Empire, including Great Britain, North Africa, Spain, and Mesopotamia.

## A Stratatlantic Flight?

A young Irish pilot, Mr. Charles L. Foley, is planning a stratospheric flight across the Atlantic, from New York to Dublin and back, within sixty hours.

## A New French Catapult

Reports from Brest state that the cruiser *Duguay-Trouin* has been equipped with a new catapult for the launching of seaplanes, and that successful tests have been carried out with pilotless machines.

## Door Lock Controversy Revived?

A young Swiss school teacher and his sweetheart committed suicide last week by jumping from an aeroplane while flying over the Basle district. It appears that the young man was in financial difficulties, and, having booked all the seats in the machine, both went up for a flight and jumped out when the pilot's attention was otherwise engaged.

## Ambitious

Here are Mr. Clive Pangborn's plans for a flight round the world in four days this summer: Leave New York at dawn, reach Moscow 8 a.m. next day, non-stop; refuel, set off the same morning for Chita (Siberia), arriving the following afternoon; refuel and proceed in the evening for New York via the North Pacific, arriving in the afternoon of the fourth day. Pangborn will fly a Burnelli all-metal high-wing monoplane (two Pratt and Whitney "Wasps") having a range of 8,200 miles at a cruising speed of 150 m.p.h.

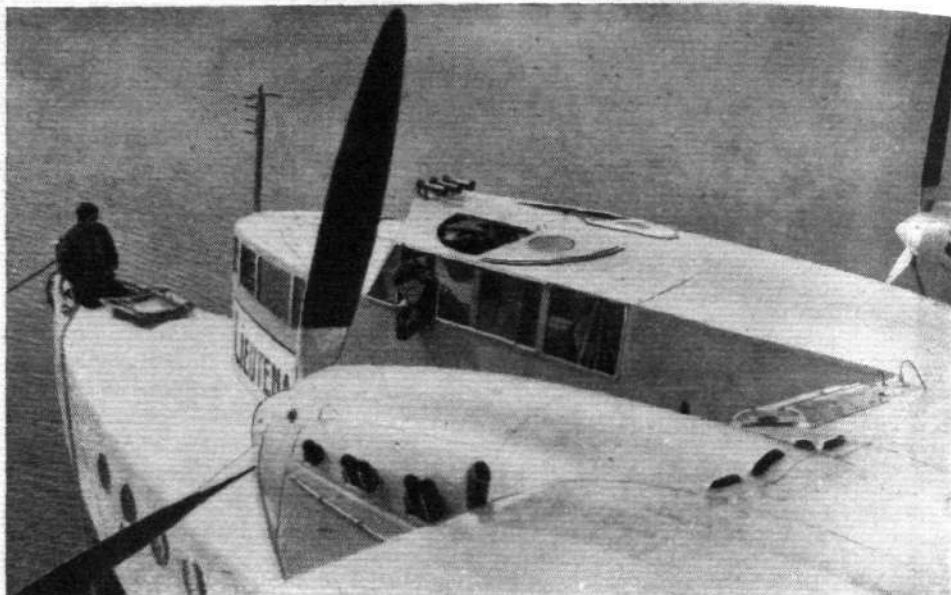
## Aeroplane Aids Sea Rescue

An aeroplane rendered valuable assistance in rescuing a Portuguese seaman who had been clinging for twenty-four hours to a storm-swept rock after his vessel had been wrecked on the Moroccan coast at Casablanca. The machine first flew over the rock and dropped a rope, then some lifebelts, one of which the sailor secured. On a third flight food and blankets were dropped, then, next day, when it was seen that the man could not hold on much longer, the machine flew out to the rock, pouring quantities of oil on the water, thus enabling a boat to reach the rock and finally rescue the seaman.

## Twenty-five Years Ago

From *Flight* of March 5, 1910

"A Novel Biplane.—On the new biplane which has been designed and built by MM. Guyot and Verdier, and with which they will shortly be conducting trials at Le Dorat, the propeller will be placed in front, where it will be driven by a 60 h.p. E.N.V. motor."



LOOKING FORWARD: An unusual view of the new Latécoère 521 flying boat, *Lieutenant de Vaisseau Paris*, now undergoing trials, showing the pilots' compartment, and wireless cabin (in front of the former).

## A Jubilee

On March 19, 1910, Jonkheer I. L. van den Berch van Heemstede was appointed Secretary-General of the Royal Aero Club of the Netherlands. He has remained as a member of the committee, as secretary and as vice-president of the club at various times ever since, and thus on March 19 will celebrate twenty-five years' uninterrupted connection with the club. To commemorate the event a small committee has been formed for the purpose of collecting together, for inclusion in an album, the signatures of all those who in that long period have come into contact with Jonkheer van den Berch van Heemstede and who wish to show in this manner their appreciation of his good work for aviation, largely in connection with the F.A.I., of which he is at present vice-president. He is also



Jhr. van den Berch van Heemstede, whose "jubilee" as Secretary-General of the Dutch R. Ae. C. is described above.

director-general of the I.A.T.A. It is also hoped that it will be possible to present the veteran with a suitable *objet d'art*. Signatures for the album may be sent to Mr. B. Stephan, 84, Rokin, Amsterdam, and contributions should be sent to the bankers, Lippman, Rosenthal and Co., Amsterdam, marked "Huldeblijk van den Berch van Heemstede." *Flight* takes this opportunity of thanking Jonkheer van den Berch for his long and useful work for aviation, and of expressing the hope that he may for many years to come continue that work.

## Wiley Post and Sabotage

It is reported that, during an overhaul of the engine of Wiley Post's Lockheed "Vega," after his unsuccessful attempt at a stratosphere flight across the United States, a large quantity of emery powder and metal filings had been found in the oil supply.

## East is East: or Amee Jhonnie

Miss Wong Seow Hoon, of Selangor, is a fully fledged Chinese aviatrix, and recently she flew, with her father, to Penang, where she was accorded an enthusiastic reception by the Keng-chieu Community. Dr. Ong Huck Chye, President of the Ongkongsi, presided at the reception, which (according to a Penang journal) included Ong Sin Seng, Ong Chin Ooh, Ong Joo Sun, Ong Theng Poe, Ong Teik Hock, Ong Kah Kee, Ong Hock Lye, Ong Huck Keat, Ong Ewe Jin (and presumably) Ongle Tomkobi and others. The President hailed Miss Wong as the "Amy of the East."

## Mee Amee Too

According to a Singapore journal, Miss Wang Chiew Wan, a Chinese schoolgirl, who recently flew a D.H. "Moth" from Kuala Lumpur to Singapore, also claims to be an "Amy" of the East—anyway, she is a keen and skilful pilot.

# Correspondence

The Editor does not hold himself responsible for opinions expressed by Correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

## THE GRID DANGER

[3014] In your editorial of January 24 you referred to the danger to aircraft from the overhead transmission lines of the grid system, and you stated that "competent electrical engineers are definite that it is quite impracticable to carry the cables underground. The difficulties of insulating lines of such high voltage put this out of the question."

Admittedly this is so under present-day technique, but much progress is being made with gas- and oil-filled cables, and high-voltage cables up to 110,000 volts are already in use in England; so the future may not be as black as you suggest, even if there is no immediate prospect of a solution.

But there is another aspect of the problem which, in my opinion, is even more serious, though it, also, is capable of solution. I refer to the lower-voltage rural distribution systems associated with the main high-voltage grid. In England, rural distribution by underground cables is far less common than in other countries; e.g., Holland has a distribution system of over 10,000 miles of underground cables working at a pressure of 10,000 volts.

It is bad enough for pilots of aircraft flying in poor visibility to have to risk the dangers of the main high-voltage grid, but this system can be marked by neon beacons or other devices, and runs over comparatively few routes; if, in addition to this, the countryside is covered with a network of equally dangerous overhead lines carrying the rural distribution systems, all a pilot can do is to ignore their existence and trust to luck.

If, on the other hand, it were made compulsory for all high-voltage sub-circuits of the grid to be distributed by underground cables, the danger to aircraft would be kept within bounds.

D. DE BURGH.

Squadron Leader, R.A.F.  
A.M.I.E.E.

H.Q., R.A.F., India.

## TRAINING OF COMMERCIAL PILOTS

[3015] With reference to your "Outlook" paragraphs in your issue for February 28, exclaiming with surprise that there is a shortage of really good transport pilots, I cannot help feeling that if you consider the past history of aviation in general, and in particular the history which affects the training of pilots, you will express surprise that there are as many pilots suitable for work on air lines as there are, and not that there is a shortage.

Apart from one or two schools especially established to train pilots for this work, there is, practically speaking, no source from which they may be drawn. Pilots fresh from the R.A.F., while good fliers, are more often than not entirely unsuitable for air-line work. They have the Service outlook, which in nine cases out of ten leads them to judge an aeroplane by the way it can be thrown about, and also to consider themselves as a race apart just because they can fly. The ability to pilot an aeroplane is of no use at all to a would-be air-line pilot unless he has the "commercial" temperament, and that is what very few ex-R.A.F. pilots possess.

Your suggestion that operators should run instructional services over all routes is neither likely to prove economically possible nor is it calculated to inspire confidence in passengers who learn about the practice. I suggest that when a suitable man has been chosen, in the first place for his "commercial" character, he will, failing the obvious method of working as second pilot—a method which functions admirably and does train pilots in all major air-lines like Imperial Airways, despite your suggestion that it does not—be given work on freight and ferry services; then afterwards, when he has proved his ability, on passenger services in increasingly bad weather conditions. Even in machines which normally carry only one pilot it is a simple matter, when passenger space is not filled, for a second pilot to travel in the machine and thus gain some experience.

J. FROST.

Kensington.

## MELBOURNE RACE ECHO

[3016] I suppose that our doings have long ceased to be of interest to anyone in England, if indeed they ever were; to fly from Mildenhall to Melbourne in one month is not really good, even if the machine was in a very unready condition. I notice, however, that it was reported that we broke the

prop. at Athens. This is what actually happened: Somebody either pushed the machine into something or backed a car into it at Rome and said nothing. We apparently flew from Rome to Athens with a cracked prop.; how it stuck it out I do not know. When we arrived at Athens it was on the point of dissolving.

Since leaving Melbourne I have flown about 8,000 miles, working hard and leading a very hard life indeed. Aviation out here is in an exceedingly raw state; when we are able to joy-ride from an aerodrome it is thought to be excellent, and when there is actually a hangar as well, words fail to express our delight.

I hope to return at the end of February to the land where whirlwinds, red dust, mosquitoes, blowflies, and heat are not, and I hope to do it in seven days just to sort of show what we can do when we try. However, we shall see what we shall see.

H. L. BROOK.

Sydney.

[Mr. Brook was flying the experimental Miles "Falcon."—ED.]

## MAGNESIUM ALLOY PROGRESS

[3017] I was very much interested in the notes on the Paris Aero Show recently contributed by Mr. H. J. Pollard to *The Aircraft Engineer*, but I fear his comments on magnesium alloys in aircraft are likely to give a wrong impression to many English readers.

If Mr. Pollard had extended his survey to engine details he would have ascertained that the application of magnesium alloys is making steady progress, not only as regards the number of firms availing themselves of the advantages inherent in the material, but also the increasing number of parts which are now made from magnesium alloys as standard practice, where a few years ago only timid experiments were conducted.

Apart from engines some progress should also have been noted in regard to the aeroplanes, since most of the machines now shown are fitted with cast magnesium alloy landing wheels, and, as the experience of some years is available on this application, there seems to be no difficulty in regard to corrosion, even with parts necessarily in contact with steel, brass, or other heavy metals.

Practically all the water-cooled engines in the show up to approximately 300 h.p. included magnesium alloy crank cases and other heavily stressed parts. Air-cooled engines certainly seem to show only minor application of this very light metal, and that is possibly because forging production is not so far advanced, although it is well on the way, even in England, to satisfactory accomplishment.

The technique of forging magnesium alloys has, however, made very considerable progress; all the German touring planes exhibited in Paris were fitted with forged propeller blades of magnesium alloy. Samples of even larger blades shown by some propeller manufacturers lead one to believe that real progress is being made with this application in the most powerful machines, where the metal blades are found to unite the advantages of metal propellers with the low weight previously considered to be attainable only with wooden ones.

Many of the planes exhibited at Paris (and particularly the German machines) had motor bonnets, cowlings and fairings in magnesium alloy. Often the nature of the metal was only disclosed where the paint was chipped off, and probably many visitors therefore failed to detect that a large proportion of this construction work was, in fact, made in magnesium alloy. It does not really appear that the fitting of Elektron (magnesium alloy) sheet to other structural metal now presents any difficulty, since easy methods of effective insulation are in common use. Quite obviously, the well-known fact that this sheet can only be shaped readily to more or less complicated form at a temperature of about 300° C. demands the adoption of modified working methods which, however, with ordinary tool and jig equipment, prove far from difficult in any modern workshop.

The drawing of sections from magnesium alloy strip, for instance, which was supposed by your contributor to be a great art and especially difficult operation, differs only from normal everyday section drawing in other materials by the direction



### Correspondence

of a simple gas jet with controlled pressure on to the strip before it enters the matrix, and in this manner tons of magnesium alloy sections have been produced at an extra cost per foot (compared with that of other metals) comprising only the cost of this magic gas burner, with possibly, in the case of the most complicated sections, a little extra cost due to the somewhat lower speed.

The insulation of light alloys against heavy metals certainly has to be watched carefully, but it is already standard practice in the aircraft industry to use proper insulating methods with duralumin against steel, brass, etc., if the contact areas are likely to be subject to atmospheric action. These precautions, naturally, are also necessary with magnesium alloy sheet. As it happens, however, no insulation is required between ordinary magnesium alloys and aluminium or aluminium alloys unless the latter contain copper or other heavy metal; even then protection with a coat of paint on the contact areas is found in practical use to suffice against atmospheric attacks. Sea-water attack need not be taken into account in this matter.

As regards riveting, all difficulty such as mentioned in Mr. Pollard's article is obviated by utilising with magnesium alloy sheets and sections only aluminium alloy rivets which have no content of heavy metal. Suitable rivets with adequate tensile and shear strength are everywhere available, and these, far from having to be closed hot, are easily worked cold without even the preliminary treatment requisite in the case of duralumin rivets. In this way the fearsome outlook of insulating thousands of rivet shanks is happily avoided.

Taking into account the fact that exhibitions like the Paris one always hobble a good way behind the real standard of development in technical and production matters, I wonder whether the information I have is correct—namely, that machines built entirely of magnesium alloy have already taken the air without causing more travail pains than any other child of the atmosphere.

A. B. LISLE.

London, N.W.1.

### DIRECTION OF AIRSCREW ROTATION

[3018] Speaking as one who served his time building internal combustion engines, I should say that it is practically impossible successfully to design one that would be suitable for aero work, yet capable of running in either direction, as suggested by Mr. W. S. Shackleton in *Flight* of February 14.

A two-stroke will, but this type, in its present state, is not suitable. I am also aware that marine diesel engines can be reversed by use of a sliding camshaft. This is the crux of the whole problem, as the valve cams have to be reversed in their relationship. To fit such a reverse gear into a high-speed aero engine would, I am afraid, cause quite a "spot of bother."

On the other hand, it is quite as simple to build a left-hand motor as a right-hand one, and some of the war-time "crates" used by Germany were so engined. It would, therefore, be equally easy to equip multi-engined aircraft with, say, R.H. engines to port and L.H. ones to starboard. This system would, as Mr. Shackleton points out, tend to neutralise torque.

In the case of multi-engined craft with geared engines the introduction of an idler-gear between the crankshaft and airscrew on one side would give the same advantages.

As regards spares, such a system would mean that, with direct-drive engines, both left- and right-hand cam-gear would have to be carried or stocked. Duplicate airscrews could be obviated by designing a variable-pitch type that could be assembled to "pull" in either direction of rotation, and were the system widely adopted distributors could be designed and numbered so that they could be quickly fitted and wired to either type of engine.

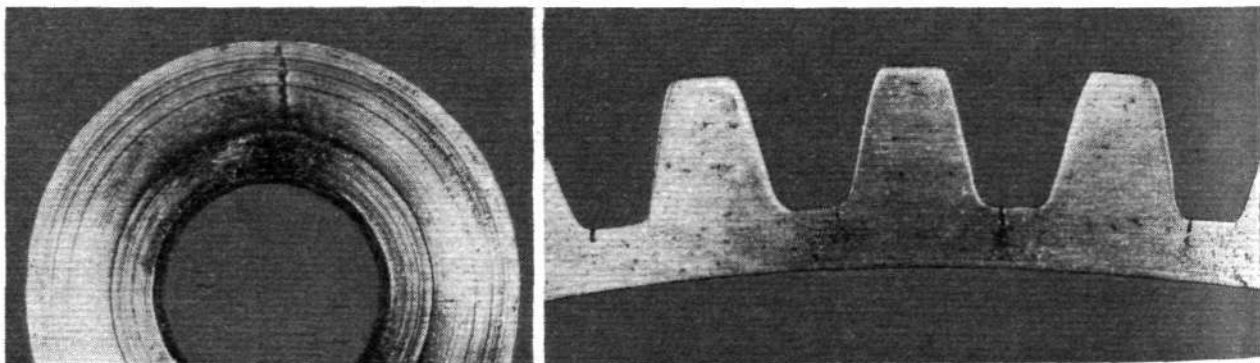
I am not *au fait* with the "internals" of modern radial engines, but, looking at the problem on the surface, this type would seem to be most adaptable, particularly the geared type. Using the idea of the idler-gear, and presupposing an airscrew of the type suggested, only the idler-pinions themselves are added to the stock or load of spares, as every other engine-part would be interchangeable.

C. W. MARTIN.

Bristol, 6.

## MAGNETIC FAULT-DETECTION

*Interesting Features of the "Magna-Flux" System Used in the Bristol Works*



These untouched photographs of a valve collar and reduction-gear teeth show how fine surface cracks, normally invisible even under a magnifying glass, are shown up as clearly defined black lines by the "Magna-Flux" testing device.

**T**O supplement the well-known acid etching method, an extremely interesting system of searching for surface defects in ferrous components is now being employed in the Bristol Company's engine department.

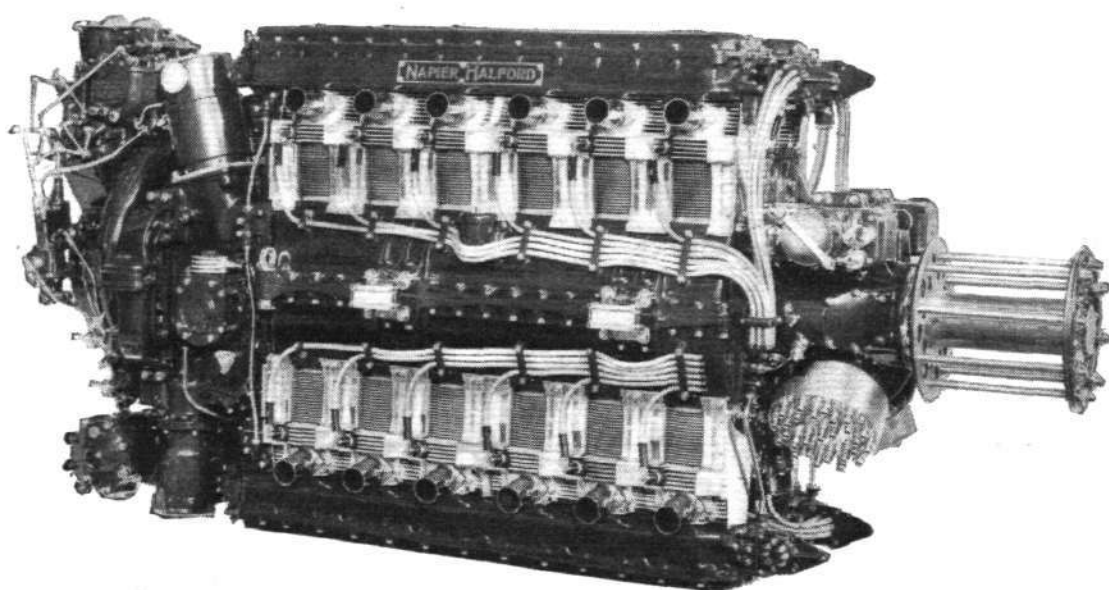
It is particularly valuable in bringing to light those extremely fine cracks which defy detection by more ordinary methods. The method of carrying out the test is very simple, and requires no particular skill since cracks are plainly shown up, as may be seen from the two examples shown in the photographs. The "Magna-Flux" apparatus itself, which is supplied by the Equipment and Engineering Company, of London, consists of a large coil energised by direct current and incorporating a solid core and adjustable sliding pole pieces, across the gap of which the component under test is placed. The intensity of the magnetic flux is controllable, since too much magnetism will smother a crack and too little will fail to reveal it; in addition, the magnetic flux may be reversed to allow the component to be removed from the machine and also to disperse any residual magnetism that may have been imparted to it.

The component, rendered free from grease, oil and carbon, is placed on the pole pieces in such a position that the field of force will be at right angles to the expected crack. With the current switched on, a liquid containing minutely divided iron particles called "detector ink," is poured gently over the component with the aid of an aluminium ladle, and any cracks are revealed by the accumulation of the iron particles on the edges through the local disturbance of the magnetic flux. A crack will always be sharply defined and may be quickly confirmed by a second test.

This method is applied extensively to a number of important Bristol engine components, not only at certain stages of manufacture but also after periods of running-in and endurance testing. Highly stressed components in particular are subjected to this method of inspection, including various gears and driving elements in the airscrew reduction gear, reduction gear driving shafts, crank shafts, master and articulated rods, gudgeon and articulated pins, driving elements in the supercharger drive, and numerous other auxiliary driving gears and shafts.



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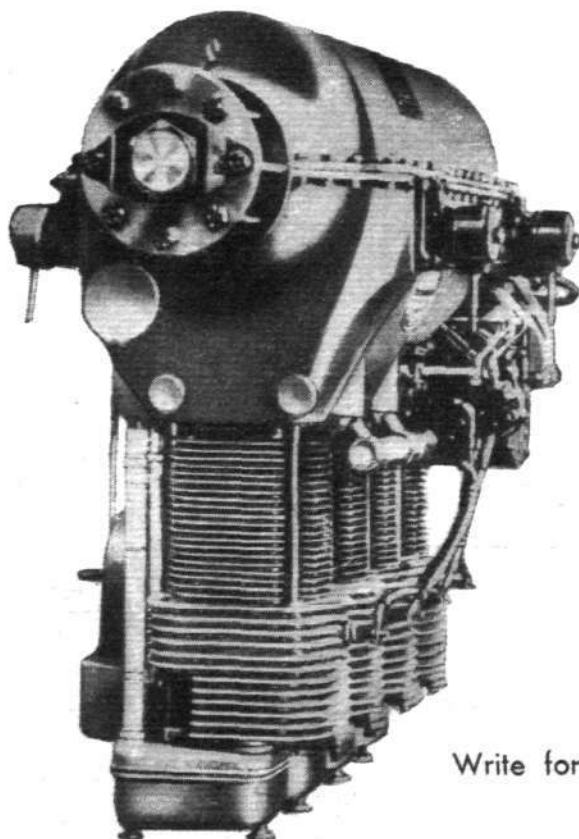
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# THE AIR ESTIMATES

*Air Estimates for 1935, Issued Last Tuesday, Show a Net Increase of £3,089,000 as Compared with Last Year's Estimates*

ISSUED by the Government last Tuesday, the Air Estimates for 1935, as was generally expected, show an increase. Actually, the net increase amounts to a total of £3,089,000 as compared with last year's estimate. The gross estimate is £23,851,100, but appropriations-in-aid are expected to amount to £3,201,100, thus reducing the total for effective and non-effective services to £20,650,000.

The estimates are set out in detail in the following pages:—

## Personnel

The numbers of personnel to be borne on the establishment of the R.A.F., or attached thereto, exclusive of India, are:—  
Air Officers: Total, 43 (an increase of 2). Other commissioned Officers: 3,255 (an increase of 105). Cadets: 110 (no change). Warrant Officers: 443 (a decrease of 7). Non-commissioned Officers: 7,011 (an increase of 561). Aircraftmen: 19,096 (an increase of 47). Apprentices and Boys: 3,042 (an increase of 1,292). Number to be voted: 33,000 (an increase of 2,000).

## Financial Expenditure

*Vote 1.—Estimate of the sum required for pay, etc., of the R.A.F.:* Pay and personal allowances of officers, £1,294,000; pay and personal allowances of airmen, £2,427,000; marriage allowance, £145,000; National Insurance schemes—employer's contributions in respect of airmen, £78,000; miscellaneous allowances and payments, £44,000; civilians, £1,146,000; Service gratuities to airmen on discharge, etc., £13,500; recruiting staff and expenses, £8,500. Gross total, £5,156,000. Appropriations-in-aid, £609,000. Net total, £4,547,000\*. Net increase, £337,000.

\* Includes £6,400 formerly provided under Vote 3, subhead B.

*Vote 2.—Quartermen, Stores, Supplies and Transportation:* Accommodation allowances, £196,000; Barrack services, £55,000; Fuel and light, £245,000; General stores, £126,000; Clothing, £215,000; Provisions and animals, £504,000; Transportation, £396,000. Gross total, £1,737,000. Appropriations-in-aid, £104,000. Net total, £1,633,000\*. Net increase, £143,000.

\* Includes approximately £10,000 in respect of the R.A.E., Farnborough, formerly provided under Vote 3, subhead B.

*Vote 3.—Technical and warlike stores* provide for the following amounts:—Aeroplanes, seaplanes, engines and spares, £6,896,000; Experimental and research establishments, £357,500; Inspection services, £227,000; Instruments, photographic and miscellaneous stores, £188,500; Armament and ammunition, £718,000; Electrical stores, £218,000; Miscellaneous research and development, £178,000; Miscellaneous materials, £157,000; Balloons and hangars, £6,000; Mechanical and other transport, £256,000; Petrol and oil, £830,000. Rewards to inventors, £1,000; Airship development, £18,000. Gross total, £10,051,000. Appropriations-in-aid, £2,049,000. Net total, £8,002,000. Net increase £782,000.

*Vote 4. Works, buildings and lands,* shows the following

figures:—Staff for works services, £282,500; New works, additions and alterations, amounting to £2,500 each and upwards, £2,141,000; New works, additions and alterations under £2,500 each, £116,000; Ordinary repairs, renewals and maintenance, £500,000; Grants towards the cost of works, £500; Purchases of lands and buildings, £180,000; Rents and reinstatements, £30,000; Surveys and miscellaneous services, £11,000; Stores

**Explanatory Statement, showing the provision in Estimates, 1935, for Scientific Research and Technical Development, corresponding to the provision made for these services in 1934.**

Service	1935	1934
Aeroplanes and spares ... ..	(a) £ 653,000	£ 707,000
Royal Aircraft Establishment, Farnborough ...	287,000	408,500 (b)
Salaries, etc., of personnel at other experimental and research establishments ... ..	70,500	70,500
Instruments and photographic equipment ... ..	8,500	9,000
Armament and ammunition ... ..	58,000	44,500
Wireless and electrical equipment ... ..	19,000	8,500
General (components and accessories) ... ..	31,000	44,000
Contributions and grants ... ..	122,000	85,000
Balloons and hangars ... ..	4,000	3,000
<b>GROSS TOTAL</b> ... ..	<b>£1,253,000</b>	<b>£1,380,000</b>
Deduct—		
Appropriations-in-aid ... ..	—	41,000
<b>NET TOTAL</b> ... ..	<b>£1,253,000</b>	<b>£1,339,000 (c)</b>
Add—		
Net provision in other Air Votes—		
Vote 1. Pay, etc., of the Royal Air Force ...	6,400	—
Vote 2. Quartermen, stores (except technical), supplies and transportation ...	20,000	10,000
Vote 4. Works, buildings and lands ...	78,000	2,500
Vote 9. Miscellaneous effective services ...	3,000	1,000
Vote 10. Air Ministry (Joint Directorate of Scientific Research and Technical Development) ...	80,000	75,000
Vote 11. Non-effective services ... ..	3,600	500
	<b>£1,444,000</b>	<b>£1,428,000</b>

(a) Includes £40,000 for experimental machines of civil types.

(b) Includes provision for certain services provided for in 1935 under Votes 1, 2, 4, 9 and 11.

(c) The form of estimate for the Royal Aircraft Establishment, Farnborough, has been revised. To facilitate comparison the 1934 provision in the several subheads of Vote 3 in respect of this establishment has been re-allocated to subhead B.1.

and plant for works (net), £31,000; machine tools, £36,000. Gross total, £3,328,000\*. Appropriations-in-aid, £183,000.† Net total, £3,145,000. Net increase, £1,470,000.

\* Includes approximately £86,000 for services hitherto provided for under Vote 3, subhead B. † Includes £12,500 for receipts hitherto provided for under Vote 3, subhead P.

*Vote 5.—Medical Services:* Pay and personal allowances of officers, £136,000; pay and personal allowances of airmen, £86,000; Nursing service, £21,500. Fees to civilian medical practitioners, £12,500; Salaries and wages of civilians, £18,000; Medical stores and supplies, £14,000; Payments to hospitals, £25,000; Miscellaneous charges, £2,000. Gross total, £315,000.

## AIR EXPENDITURE, 1929 TO 1933, AND AIR ESTIMATES, 1934 AND 1935.

Vote	Financial Year	1929	1930	1931	1932	1933	1934 (Estimate)	1935 (Estimate)
A	Numbers	(a) 29,240	(a) 29,988	(a) 30,263	(a) 29,520	(a) 28,470	(b) 31,000	(b) 33,000
1	Pay, etc., of the Royal Air Force	£ 3,550,413	£ 3,710,848	£ 3,836,741	£ 3,866,857	£ 4,020,086	£ 4,210,000	£ 4,547,000
2	Quartermen, stores (except technical), supplies and transportation	1,670,589	1,697,433	1,525,545	1,470,787	1,399,492	1,490,000	1,633,000
3	Technical and warlike stores (including experimental and research services)	6,968,333	7,681,057	7,846,336	7,352,003	6,952,856	7,220,000	8,002,000
4	Works, buildings and lands	1,852,543	1,606,732	1,724,928	1,523,535	1,389,938	1,675,000	3,145,000
5	Medical services	279,921	290,715	294,153	286,198	278,483	295,000	298,000
6	Technical training and educational services	475,251	486,069	474,596	418,521	388,407	373,000	422,000
7	Auxiliary and Reserve Forces	578,842	587,751	591,011	521,982	463,791	394,000	470,000
8	Civil aviation	408,984	439,985	465,767	462,305	460,086	513,000	595,000
9	Meteorological and miscellaneous effective services	221,466	227,519	229,909	223,122	326,197	341,000	381,000
10	Air Ministry	657,938	664,799	638,321	637,556	643,482	657,000	752,000
11	Half-pay, pensions and other non-effective services	213,900	235,046	240,492	294,255	377,574	393,000	405,000
	Balances irrecoverable and claims abandoned	2,384	3,719	1,149	250	402	—	—
	<b>Net Cash Expenditure</b>	<b>16,880,564</b>	<b>17,631,673</b>	<b>17,868,948</b>	<b>17,057,371</b>	<b>16,700,794</b>	<b>17,561,000</b>	<b>20,650,000</b>

NOTE.—The figures for expenditure represent the net expenditure after taking into account receipts noted in the Appropriation Account as receipts in excess of estimated appropriations-in-aid.

(a) Average number borne.

(b) Maximum number to be borne.



**The Air Estimates.—**

Appropriations-in-aid, £17,000. Net total, £298,000. Net increase, £3,000.

**Vote 6.—Technical Training and Educational Services:** Imperial Defence College, pay and allowances and contribution towards general expenditure, £2,900; R.A.F. Staff College, Andover, salaries, wages and contingencies, £12,000; R.A.F. College, Electrical and Wireless School, and School of Store Accounting and Storekeeping, Cranwell, salaries, wages and contingencies, £131,000; School of Technical Training (Apprentices), Halton, salaries, wages and contingencies, £188,000; School of Technical Training (Men), Manston, salaries, wages and contingencies, £24,000; School of Physical Training, Uxbridge, salaries and wages, £2,900; General educational services, £64,500; Miscellaneous educational charges, £9,700. Gross total, £435,000. Appropriations-in-aid, £13,000. Net total, £422,000. Net increase, £49,000.

**Vote 7.—Auxiliary and Reserve Forces:** Pay and personal allowances of regular staff, £4,100; Pay and personal allowances during training, £27,000; retaining fees and reserve pay, £167,000; Payments to civil companies for training courses, £166,000; Miscellaneous expenses, £2,500. **Special Reserve:** Training, £4,600; Miscellaneous expenses, £400. **Auxiliary Air Force:** Pay and personal allowances of H.Q. staff, £11,800; Pay and personal allowances of regular staff of squadrons, £55,100; Grants to county associations, £11,000; Training, £10,800; Miscellaneous expenses, £2,200. **Auxiliary Air Force Reserve:** Training, £100. **University Air Squadrons:** Pay and personal allowances of instructors, etc., £5,900; Miscellaneous expenses, £1,300. **Voluntary Aid Detachments:** Miscellaneous expenses, £300. Gross total, £470,100. Appropriations-in-aid, £100. Net total, £470,000. Net increase, £76,000.

**Vote 8.—Civil Aviation:** Salaries and wages, £47,000; Supplies and transportation, £9,000; technical equipment, stores and experimental services, £127,000; Works, buildings and lands, £53,000; Miscellaneous, £9,000; Subsidies and grants, £503,000. Gross total, £748,000. Appropriations-in-aid, £153,000. Net total, £595,000. Net increase, £82,000.

**Vote 9.—Meteorological and Miscellaneous Effective Services:** Salaries and allowances of staff of the Meteorological Office, £52,000; salaries, wages and allowances of staff at Meteorological stations, £74,500; Fuel, light and transportation, £4,700; Instruments, equipment, stores and research, £12,500; Works services, £7,000; Telegraph, telephone, and miscellaneous charges, £18,800; Superannuation, £1,000; Miscellaneous effective services: Compensation for losses, £10,000; Losses by exchange, payments of commission, etc., £500; Aerodrome guards furnished from the Iraq Army, £98,000; Telegraph and telephone charges, postage abroad, £68,500; Miscellaneous, £34,500; Allowances to ministers of religion, £8,000; Payments to civil companies for preliminary flying training of regular personnel, £19,000. Gross total, £409,000. Appropriations-in-aid £28,000. Net total, £381,000.\* Net increase, £40,000.

\* Includes approximately £1,000 and £1,700 for services hitherto provided for under Vote 1, subhead E, and Vote 3, subhead B.

**Vote 10.—Air Ministry:** Salaries, wages, etc., £757,500; Appropriations-in-aid, £5,500. Net total, £752,000. Net increase, £95,000.

**Vote 11.—Half-pay, Pensions, and other Non-effective Services:** Rewards to officers and airmen, £370; Half-pay of officers, £8,500; Service and disability retired pay and gratuities of officers and nurses, £234,000; Wound pensions—officers, £530; Service and disability pensions and gratuities—airmen, £86,300; Pensions, gratuities and allowances to widows, children, etc., of deceased officers and airmen, £30,500; Civil non-effective payments—recurrent charges, £16,100; Civil non-effective payments—gratuities and other non-recurrent charges, £14,000; Injury grants, £8,800; Commutation of retired pay, pensions, etc., £35,000; Relief fund, £500; Miscellaneous non-effective payments, £9,900. Gross total, £444,500. Appropriations-in-aid, £39,500. Net total, £405,000.\* Net increase, £12,000.

\* Includes approximately £2,000 in respect of the R.A.E., Farnborough, formerly provided under Vote 3, subhead B.

## MEMORANDUM BY THE SECRETARY OF STATE FOR AIR

### Financial Summary

THE gross total of Air Estimates for 1935, at £23,851,100, reflects the first stage of the expansion scheme approved by Parliament last summer in an increase of £3,685,500 over the corresponding figure for 1934. The increase in the net total, at £20,650,000, is £3,089,000.

Strict economy has again been exercised throughout the individual Votes and Subheads; and a substantial allowance has also been made for the underspending, due to unforeseen delays, which experience has shown to be the inevitable accompaniment of a major programme of expansion, more particularly in connection with works services.

The following table summarises the comparative figures for 1934 and 1935:—

	1935	1934	+ or -
Gross Estimate ... ..	£23,851,100	£20,165,600	+3,685,500
Deduct Fleet Air Arm grant ... ..	1,873,000	1,338,000	+535,000
Deduct Other Appropriations-in-aid ... ..	1,328,100	1,266,600	+61,500
Net Estimate ... ..	£20,650,000	£17,561,000	+£3,089,000

### General Policy

Twelve months ago, in the memorandum accompanying Air Estimates for 1934, His Majesty's Government made it plain that they could not, in the interests of our national and Imperial security, accept a position of continuing inferiority in the air. Accordingly, last summer, having regard to the rapid development of foreign air forces and the failure to date of the Disarmament Conference to produce concrete results, they reached the reluctant decision that there was no option but to put in hand the long-delayed expansion of the Royal Air Force; and a programme to this end was announced to Parliament in July. This provides for the addition of a total of 41½ squadrons by the end of 1938, and, on its completion, the total first-line strength of the Royal Air Force in regular squadrons will be approximately 1,330 aircraft. In addition, there will be some 130 aircraft in non-regular squadrons. Four of the 41½ squadrons were formed in 1934, and a further 25 are to be formed in the years 1935 and 1936. The programme is being so arranged that it will be possible to retard or accelerate it in accordance with the requirements of the international situation.

Discussions have recently been initiated between the principal countries of Western Europe with a view to the conclusion of an Air Pact giving greater definition to the Locarno Treaties, and designed to afford protection to its signatories against the risk of unprovoked attacks from the air. His Majesty's Government take the view that the conclusion of such a Pact should be of the utmost value in the maintenance of European peace, as affording a powerful deterrent to aggression; and it is their earnest hope that it may facilitate the early limitation of the air forces of the world by general international agreement.

### Strength, Distribution and Organisation of the Royal Air Force

In 1935 eleven new squadrons will be added to the Home Defence Force. This will then comprise 54 squadrons—of which 41 will be regular and the balance Auxiliary Air Force or Cadre (Special Reserve) squadrons. Further, the Fleet Air Arm will be increased by 19 first line aircraft.

These new formations will raise the total strength of the Royal Air Force, including the Fleet Air Arm, to the equivalent of 106½ squadrons, viz., 93½ regular squadrons, supplemented by the 13 non-regular squadrons of the Home Defence Force.

### Operational Activities Overseas

Operational activities by the Royal Air Force overseas in 1934 have been confined to the repression of comparatively minor disturbances, but further practical illustration has been forthcoming of the humanity and effectiveness of the air arm in the maintenance of peace in primitive tribal territory.

### Development of Air Routes, Long-distance Flights, and Other Exercises

Numerous long-distance and inter-Command flights were again carried out in 1934.

Thus in January and February a flight from Aden to Sierra Leone and back was undertaken by four aircraft of No. 8 (Bomber) Squadron. This flight had unfortunately to be curtailed owing to an outbreak of yellow fever in Gambia.

A series of inter-Command flights were also carried out between Iraq and Egypt, India and Singapore, and Malta and Egypt. The range of these inter-Command training flights, and the number of aircraft engaged, have been steadily increased of recent years, and, where possible, the practice of carrying maintenance personnel and stores by transport aircraft has been further developed in accordance with the policy of making these flights as self-contained as possible.

**The Air Estimates.—**

The recent flight from India to Singapore and back—a distance of 6,000 miles—was carried out by a complete squadron of twelve aircraft. Later in the year it is intended to carry out further exercises by squadrons moving from Egypt to India, Iraq to Singapore, and Singapore to India. It is also hoped to arrange for a flight of landplanes to visit the Union of South Africa.

In the early summer a cruise was made by three flying boats of No. 205 (Flying Boat) Squadron from Singapore to Hong Kong with the object of exercising the squadron in operations at a distance from its main base. A distance of 4,300 miles was flown in the course of the cruise, during which the South China Sea was circumnavigated and visits were paid to the Philippines and French Indo-China.

The Royal Air Force was represented at the Centenary Celebrations at Melbourne and Toronto. No. 203 (Flying Boat) Squadron flew from Basra to Melbourne and back to take part in the former, covering in their flight a distance of approximately 19,000 miles. In connection with the Toronto celebrations, aircraft from No. 1 (Fighter) Squadron made a tour of the provinces of Ontario and Quebec. These aircraft were transported by sea from England to Canada and effected at St. Hubert, the airport of Montreal.

Sites for emergency landing grounds were selected on the west coast of Burma during the year, and are now being developed so that the section of the air route between Calcutta and Singapore may be used uninterruptedly during the South West monsoon, which is marked by torrential rainstorms. A successful survey has also been made for a trans-India flying boat route between Karachi and Calcutta in order to shorten the previous route, which was *via* Ceylon. This route was used by the squadron which visited Melbourne, and resulted in a total saving of approximately 2,400 miles on the outward and return journeys.

The linking up of Aden and Basra, *via* the Hadhramaut coast, by a chain of landing grounds has been completed.

For the first time since 1931, full-scale air manoeuvres were held over the London area, between the 23rd and the 26th July. In all, 32 squadrons participated. The Observer Corps and six Searchlight Companies of the Territorial and one of the Regular Army afforded valuable co-operation. A total of 2,792 hours' flying was carried out during these exercises without accident.

**Personnel and Training**

Vote 1 (Pay, etc. of the Royal Air Force) stands at a net total of £4,547,000, thus showing a rise of £337,000 on the current year's figure.

Special measures were taken during the year to meet the personnel requirements of the expansion scheme. These include largely augmented entries from civil life and extensions of service of selected officers and airmen.

The entry into permanent commissions through the Royal Air Force College and the Universities has been increased, whilst the number of short-service officers to be entered from civil life and of airmen pilots from within the service will rise from a pre-expansion figure of 250 to 540. A fourth Flying Training School was opened in October last to cope with these additional entries, and a fifth will be opened in April. The yearly entry of boys for training as aircraft apprentices is being brought up from a pre-expansion figure of 550 to over 1,000.

The number of officers and airmen whose service is to be extended must, of course, be regulated with a view to ultimate long-term requirements; a substantial number of extensions has, however, been authorised.

The reorganisation of the fitter-rigger group of trades, referred to in the memorandum accompanying 1934 Estimates, is now being carried into effect and, by reducing the relative number of skilled men necessary, will be of material assistance in meeting the increased requirements of expansion.

A new scheme has been drawn up to broaden the basis of the existing flying training organisation, whilst at the same time raising the standard of efficiency of the pilot on first joining a squadron. It is proposed that the first stage in the training of short-service officers and airmen pilots shall in future consist of the course of 50 hours' flying at civil training schools at present undergone by direct entrants into the Royal Air Force Reserve. From this course pupils will proceed to a Royal Air Force Flying Training School, where they will be trained on service types of aircraft and will also carry out more advanced work in instrument and night flying, navigation, gunnery and bombing. As the scheme develops, it will provide increased opportunities to the civil industry to co-operate with the Air Ministry by maintaining schools for the elementary flying training of service personnel.

The review of the requirements of the service in airmen of the different trades, referred to in last year's memorandum, is now virtually complete. As in the case of the review of the fitter-rigger trades, the governing principles have been to provide for the efficient and economical performance of the duties of the various trades, whilst at the same time ensuring a career which offers adequate prospects to the competent airman. Steps have also been taken to ensure that the highly skilled tradesmen recruited through the apprentice system shall throughout their service be employed only on duties which demand their special training, and that other grades of airmen shall be given the maximum opportunity to qualify for skilled duties. As a result, a substantial majority of airmen enlisted as unskilled aircraft hands will have a prospect during their service of receiving some form of trade-training.

A new class of "Boy Entrant" has been introduced to meet the requirements of the trades of Armourer, Wireless Operator and Photographer, which need a good standard of education, but not the high degree of mechanical knowledge and skill possessed by boys trained as aircraft apprentices. Competition for aircraft apprenticeships is always so keen that there is a surplus of unsuccessful candidates of good quality, and boys selected from among these by interview are now given an opportunity of receiving as "Boy Entrants" the shorter training which is all that the trades above specified require.

The system of providing for observer duties in the Royal Air Force by the employment of airmen as air gunners, mainly on a part-time basis, has become inadequate to the requirements of the service, as the work of squadrons has increased in complexity and the organisation of the crews of aircraft has developed. It has accordingly been decided to introduce a new type of air observer who will replace in large part the present air gunner. These observers will be drawn from airmen of the trades recruited through the aircraft apprentice and boy entrant schemes—mainly from the armament, signal and photographer trades, the duties of which are most closely connected with the work of squadrons in the air. By ensuring a well-educated type of observer and employment on this duty for a substantial period of years, this scheme should considerably enhance efficiency.

**Auxiliary and Reserve Forces**

The net total of Vote 7 (Auxiliary and Reserve Forces) is £470,000, an increase of £76,000 on the figure for 1934.

Concurrently with the expansion of the regular Air Force, steps have been taken to effect a substantial increase in the pilot reserve. It has further been decided to place the system of entry on a new and broader basis. Entrants for flying duties will in future be accepted only as airman pilots, but will become eligible at a later date to compete for a limited number of reserve commissions. This system has been successfully inaugurated, and numerous candidates of excellent quality are coming forward.

The strengths of Special Reserve and Auxiliary Air Force personnel for 1935 show slight increases over the numbers for 1934. Certain of the Cadre and Auxiliary Air Force squadrons again played a successful part in the Air Exercises.

Measures are being taken to widen the field of recruitment into permanent commissions from the Universities of Oxford and Cambridge, and it has been decided to make a more extended use of the University Air Squadrons in this connection. The ordinary membership of each of these squadrons is seventy-five, and at present many candidates for commissions have no opportunity of joining the squadrons owing to this limitation on numbers. In order to give such candidates experience of flying, it has been arranged that those whom the University authorities contemplate recommending for commissions shall be accepted in their last academic year as *additional* members of the squadrons.

It has now been decided, in consultation with the University authorities, to form an Air Squadron at London University.

**Technical Equipment**

The net total of Vote 3 (Technical and Warlike Stores) is £8,002,000, a rise of £782,000 on the corresponding figure for 1934. The increase in gross expenditure, however, at a total of £10,051,000, is £1,302,000, the difference being accounted for by the anticipated receipt of substantially larger Appropriations-in-aid. The principal item under the latter head is the Grant in respect of equipment for the Fleet Air Arm, which shows an increase of £520,000 as compared with 1934.

The 1935 programme provides for the initial equipment of eleven new squadrons and for the re-equipment of nineteen existing squadrons and a number of training units.

Owing to the severe financial limitations prevailing in recent years, it has only been possible to maintain stocks of equipment in the Depots at a low level. A measure of replenishment



**The Air Estimates.—**

has now become necessary, and this is covered by the increase under various sections of this Vote, notably Subhead E.

Continuous attention is being given to promoting the further efficiency of units in the repair and maintenance of airframes, engines and other items of equipment on their charge. The number of flying hours which can safely be undertaken between successive overhauls of airframes continues to increase, and there has been a satisfactory improvement in the reliability of engines.

The reduced amount taken for petrol reflects the results of a fall in prices, combined with economies in consumption. The further improvement in the octane value of aviation spirit, which was alluded to last year, is now materialising, as suitable engines are brought into service. A considerable extension in the use of this higher grade spirit will take place in 1935. Nine squadrons are already operating on petrol produced from British coal, and this number will be increased.

**Research and Technical Development**

The provision for experimental services (Appendix I to the Estimates) shows an increase of £16,000 on the figure for 1934.

A considerably increased experimental programme is to be put in hand in 1935, and the decrease in the cash provision under Subhead A of Vote 3 in respect of experimental aircraft and engines is due to the fact that a substantial proportion of the payments to be made under that programme is not expected to mature until 1936.

The provision for the development of experimental aircraft includes a contribution to Imperial Airways in respect of the construction and trials of a composite aircraft to the order of that firm. This experiment has in view the extension of the range of high-speed aircraft by furnishing a special means of launching them with a load which it would be beyond their capacity to lift by their own unaided power. A heavily loaded seaplane will be mounted upon a lightly loaded flying boat, from which it will be released when height has been obtained.

It has been decided to construct two experimental aircraft specially designed for high altitude and long range flying respectively.

A "Comet" aircraft has been purchased with a view to extended research into the aerodynamic qualities of this type.

The 24ft. wind tunnel at the Royal Aircraft Establishment referred to last year has now been completed and is in operation.

During the past twelve months steps have been taken to adapt existing types of aircraft to take advantage of recent engine developments, including the use of high octane fuel. This policy will be continued in the current year, and substantial improvements in performance are anticipated.

The general adoption of an automatic mixture control on carburettors has resulted in increased fuel economy.

Research on the suppression of noise in aircraft is proceeding, and progress has been made with the production of an effective engine silencer of reasonable weight.

**Airships**

The Royal Airship Works at Cardington and the mooring masts and plant at Karachi and Ismailia will again be maintained on a care and maintenance basis. A nucleus staff at Cardington continues to make a close study of airship development abroad.

**Works**

Vote 4, at a net total of £3,145,000, shows an increase of £1,470,000 over the corresponding figure for 1934. Of this increase, however, £73,500 is attributable to the transfer from Vote 3 of provision for works services at the Royal Aircraft Establishment at Farnborough.

For the rest, this increase is mainly due to the extensive programme for the construction of new stations and enlargement of existing stations to accommodate the additional squadrons to be formed under the new expansion scheme.

Work will be begun at ten new stations during the year, but, where possible, new squadrons will be located at existing stations, and the Vote includes provision for the enlargement or adaptations of twelve such stations in 1935.

Construction will also commence of the new Air Armament School at Manby in Lincolnshire to replace the present inadequate temporary accommodation at Eastchurch.

Overseas, increased provision is required for the new air base in Iraq, work on which is proceeding satisfactorily, and for the accommodation of Royal Air Force units at Singapore, both at the existing base and at the new aerodrome. A new aerodrome is to be constructed in Malta and a landing ground is to be provided at Trincomali.

**Civil Aviation**

The net total of Vote 8 at £595,000 shows an increase of £82,000 over the figure for 1934.

This increase is due mainly to the urgent necessity for providing for the improvement and development of the ground organisation on Empire air routes, so as to facilitate operation by night as well as by day. This improved ground organisation is necessary for the existing services, but will also assist in the inception of the projected Empire Air Transport Scheme, under which it is proposed that, wherever possible, all first-class mails should be carried by air.

Regular air communication between England and Australia was inaugurated in December last. The first aeroplane on the through service left London for Australia on December 8, and the first machine left Brisbane for London on December 10. The service is now in full operation. Imperial Airways, Ltd., are responsible for the extension of the England-India air service to Singapore and an Australian Company (Qantas Empire Airways, Ltd.) for the section Singapore to Brisbane. Provision has been made for subsidy payments of £34,000 to Imperial Airways, Ltd., in respect of the Karachi-Singapore section.

The subsidy payments to Imperial Airways, Ltd., in respect of the European services (£80,000), the England-Egypt service (£60,000), the Egypt-India service (£80,000), and the Egyptian-South African service (£141,000) are lower this year in each case by £30,000 in accordance with the terms of the agreements governing these services. The contribution by the Government of the Union of South Africa (£54,000) in respect of the African service is correspondingly reduced by £20,000.

Negotiations are in progress for the establishment of an air service to connect Hong Kong with the main Australian route at Bangkok. It is hoped that this service may be commenced on an experimental basis in the near future, and provision has been made accordingly. The Government of Hong Kong have indicated their willingness to contribute a substantial proportion of the cost.

Plans are under consideration for linking the British West African Colonies with the trunk route to South Africa by means of the establishment of a weekly air service in each direction between Khartoum (Sudan) and Maidugari (North-Eastern Nigeria). It is proposed that from Maidugari feeder services should be operated by a local company via Kano to Lagos (Nigeria) and Accra and Takoradi (Gold Coast). An extension to Freetown (Sierra Leone) may follow in due course. Provision has been made for initial subsidy payments in 1935 in respect of the proposed Khartoum-Maidugari service. It will be for Colonial funds to furnish any financial assistance which may be required for the local feeder services.

It has not yet been possible to inaugurate the projected air service to connect Bermuda with New York, to which reference was made last year, but it is hoped that it will be in operation towards the end of this year or early in 1936. A sum of £6,000 has been included for subsidy payments in respect of this service, 20 per cent. of which will be contributed by the Bermudan Government.

The increase in the number of air services operating to and from the United Kingdom and on internal air routes has necessitated various alterations and improvements in wireless organisation, and provision has been taken for the additional staff and equipment which will be required. It is intended to provide a number of permanent and mobile W/T stations at focal points. The local aerodrome authorities concerned are expected to co-operate by the provision of the necessary buildings and by contributions towards the cost of operating the stations.

It is proposed, in conjunction with the National Physical Laboratory, to carry out a programme of wireless research with a view to investigating further the possibilities of the use of intermediate, short and ultra-short waves as aids to the safety of air navigation.

Effect has been given to the decision announced last year to approve additional light aeroplane clubs for subsidy. Thirty-three clubs have already been admitted to the subsidy scheme, and applications from further clubs are under consideration. Twenty-five thousand pounds has been included for grants to these clubs, as compared with £16,000 in 1934. Five thousand pounds is taken for a subsidy to the Gliding Movement.

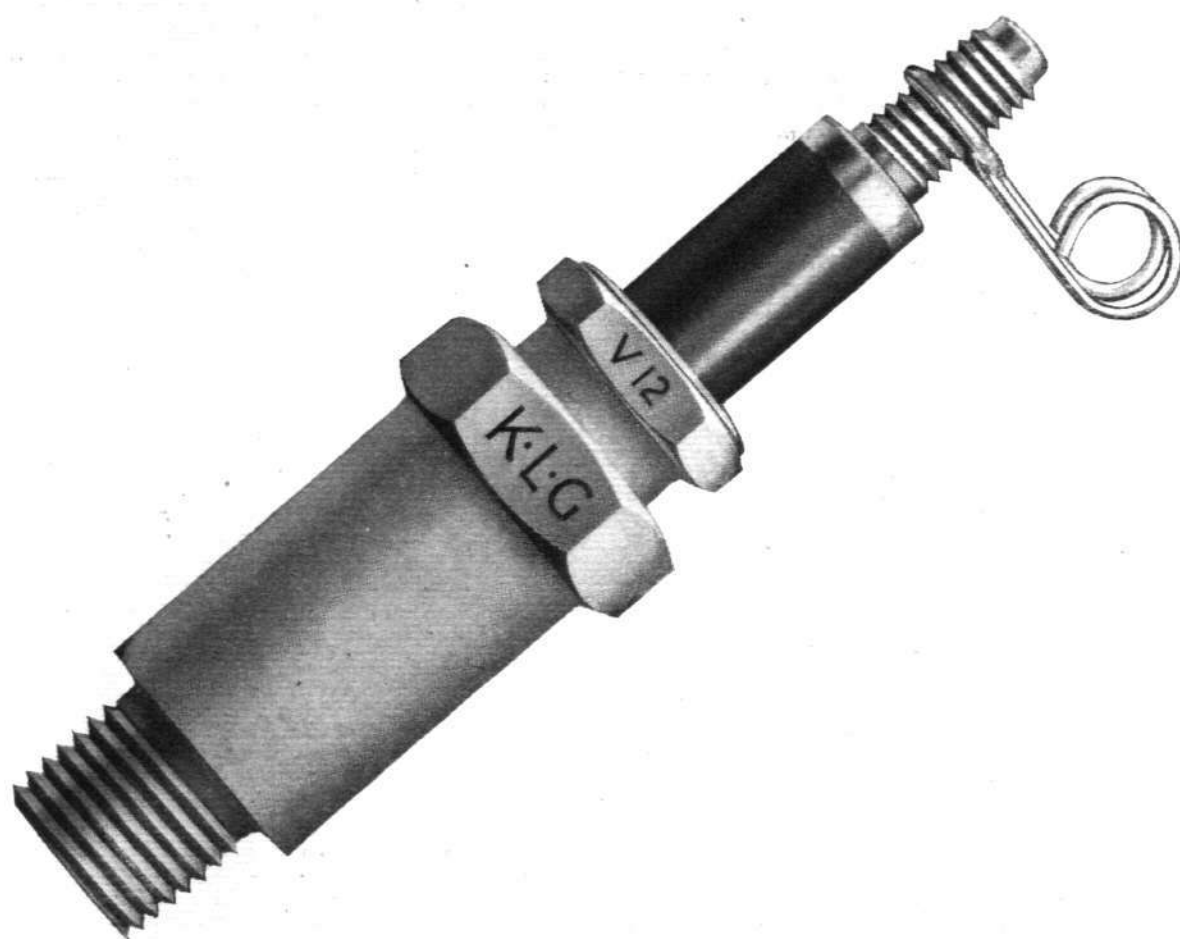
The Committee under the chairmanship of the Right Hon. Lord Gorell, to which reference was made in last year's memorandum, has rendered its report. It has been decided to give effect to the principal recommendations of this Committee (some of which will entail legislation), and negotiations with the various interests concerned are proceeding.

**Meteorology**

The net amount taken for the Meteorological Service is £155,000, being an increase of £10,500 over the figure for 1934.



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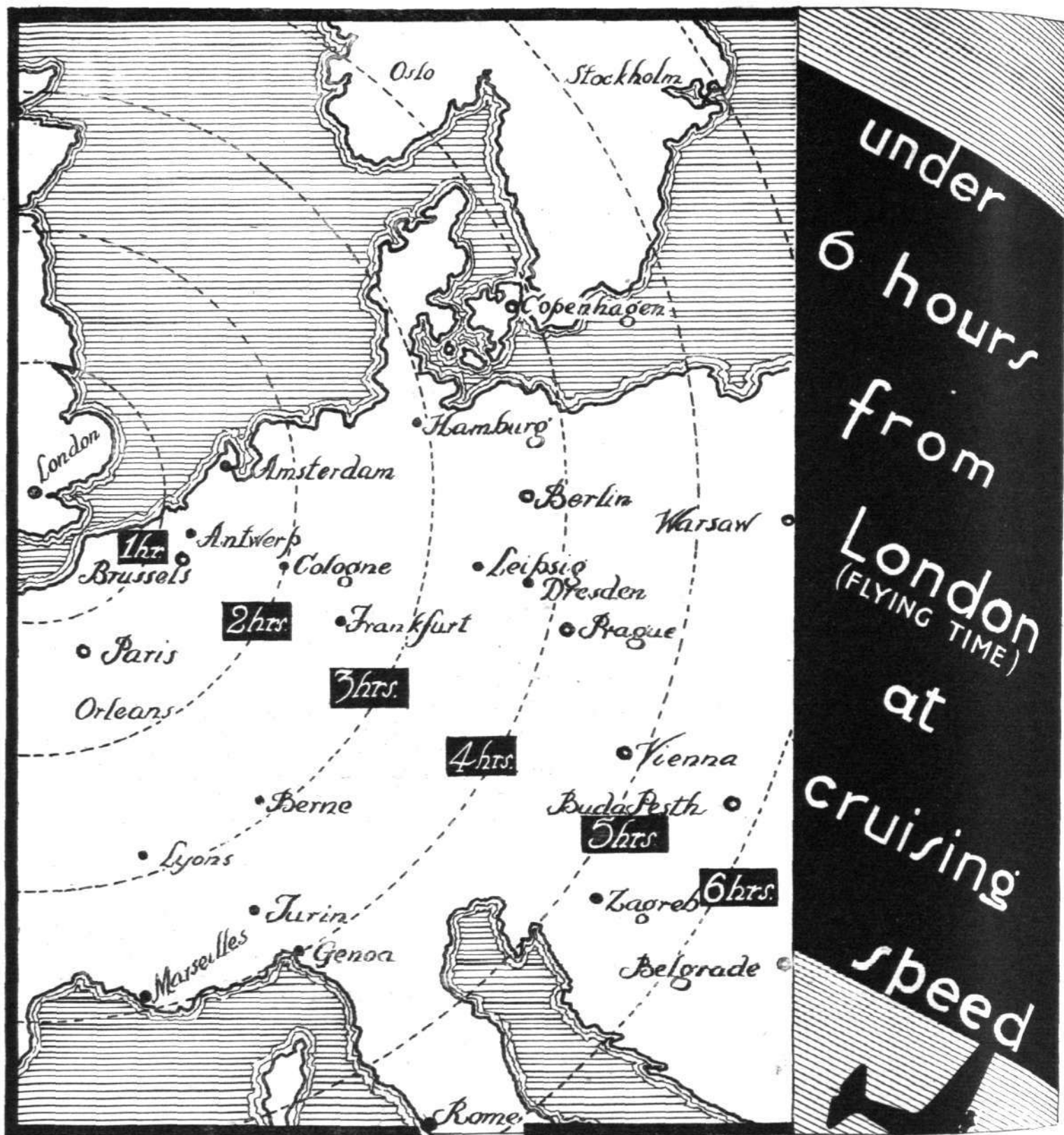
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### The Air Estimates.—

In order to improve the supply of meteorological information to air services operating in Great Britain, a number of auxiliary weather reporting stations will be established during 1935 in northern England, Scotland and the Isle of Man. These will involve increased expenditure, totalling £3,500.

The provision of meteorological information for night flying on Empire air routes will also necessitate additional expenditure.

Work is in progress in the Climatological Division of the Meteorological Office on the preparation of Meteorological Handbooks for use in ships of the Fleet operating on the various overseas stations. Five hundred pounds is included in Vote 9 for additional clerical assistance for this work, the results of which will also be available for civil and service pilots preparing for long-distance flights.

The final instalment (£2,000) of the grant-in-aid of £10,000 for Polar Year Research was paid in 1934. Now that this special expenditure is completed, the allowance for incidental items of research in meteorology, which had been temporarily reduced to £1,000, is restored to its normal figure of £2,000.

The cost of gale warning telegrams for coastal shipping, which amounts on an average to £800 per annum, has been transferred to the Votes of the Board of Trade.

### Air Ministry

Vote 10 (Air Ministry), at a net total of £752,000, shows an increase of £95,000.

This increase is due mainly to the additional work falling to all departments of the Ministry as a result of the decision to expand the first-line strength of the Royal Air Force by 50 per cent. within a period of four years.

The Air Council has been enlarged by the appointment of an additional Air Member for Supply and Organisation. The new Member will be responsible for the Directorates of Organisation and of Works and Buildings, previously under the Chief of the Air Staff, and for the Directorate of Equipment, hitherto under the Air Member for Supply and Research. The latter, who will in future be designated Air Member for Research and Development, remains responsible for the administration of research and technical development, for repair and maintenance and for inspection services.

The continued development of commercial and private flying, and the projected extensions of air services, both in this country and throughout the Empire, have necessitated increases in staff for civil aviation duties; and the status of the head of the department of Civil Aviation has been raised to that of Director-General.

LONDONDERRY.

February 27, 1935.

## THE BLACKBURN T.S.R. SEAPLANE

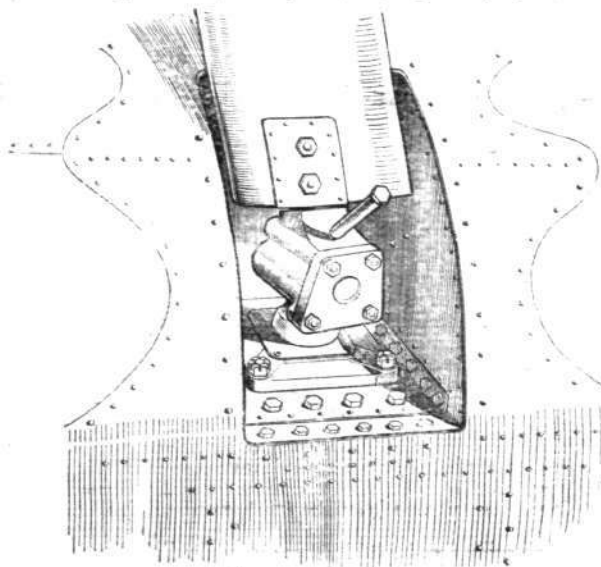
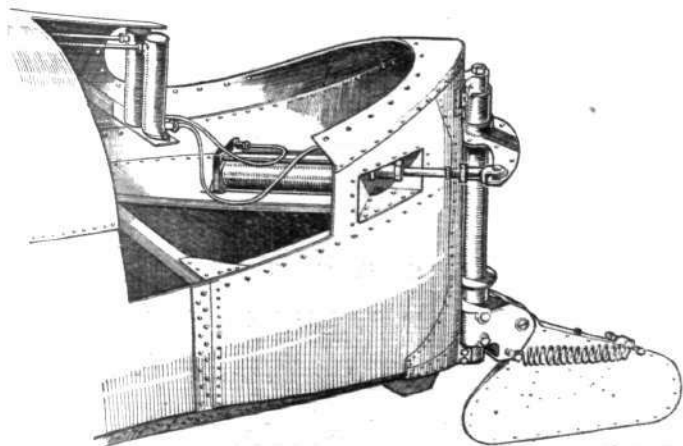
### Interesting Features in Design of Floatplane Version of "Shark"

WHEN *Flight* described the Blackburn "Shark" in the issue of December 13, 1934, it was mentioned that this machine can be supplied as a seaplane. Our photograph shows the machine as it appears with float undercarriage, and the sketches indicate some unusual features. The floats are not "handed," that is to say, the same float can be used on port and starboard sides, this being made possible by the adoption of a special joint, shown in one of the sketches.

Water rudders are fitted to the heels of the floats, and are so arranged that they are kept in the "down" position by springs, but if any obstacle is struck by a rudder, the rudder immediately springs up into a raised position. The rudders, incidentally, are hydraulically operated.



The Blackburn T.S.R. Seaplane. The engine is a Siddeley "Tiger" of 700 h.p. (*Flight* photograph.)



Unusual float details: On the left is shown the spring-loaded water rudder and the hydraulic mechanism for operating the rudders. On the right is the special joint which has been designed to avoid "handing" the floats.



# THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS



**DEMONIACAL VERSATILITY.** The first of the eighteen Hawker "Demon" two-seaters ordered by the Royal Australian Air Force is here seen being tested by Mr. M. Summers. These machines, which can be equipped for fighting, bombing, or for army co-operation work, are powered with the Rolls-Royce "Kestrel V" engine, supercharged to give a maximum of 640 h.p. at 14,000 ft. The top speed is in the neighbourhood of 190 m.p.h. (Flight photograph.)

## No. 100 (BOMBER) SQUADRON

On February 26, No. 100 (Bomber) Squadron, which is equipped with the "Vildebeest" and is stationed at Singapore, began an inter-command flight. It is flying from Singapore to Risalpur on the N.W. Frontier of India. The route is up the Malay peninsula to Rangoon and Akyab, and then from Calcutta across the Gangetic Plain of Northern India. The return journey is due to start on March 12.

## CONFERENCE ON DEFENCES AT SINGAPORE AND HONG KONG

A conference has been held at Singapore between Major-Gen. F. W. Barron, Inspector of Fixed Defences, and senior officers of the R.A.F., namely, Air Comdres. W. L. Welsh, Tedder, and Sydney Smith, to discuss extending the R.A.F. Base at Singapore. Members of the conference are also visiting Hong Kong to discuss the air defences there.

## NEW EQUIPMENT FOR S.A.A.F.

Improved "Harts" and "Furies" fitted with the latest Rolls-Royce engines, possibly steam-cooled, are being acquired by the South African Department of Defence. They will be thoroughly tested under African conditions and, subsequently, about forty "Harts" and seven "Furies" will be constructed under licence at the Government factory at Pretoria. It is possible that other British aircraft, including Avro "Tutors," will also be built.

Two Avro-built Autogiros are soon to be sent to South Africa, and, should their trials prove satisfactory, a number of these aircraft may be ordered.

## NOMENCLATURE OF AIRCRAFT—"PREFECT"

The official name of the Avro navigational training aeroplane fitted with Lynx IV engine is "Prefect."

## LONDON UNIVERSITY AIR SQUADRON

The formation of an air squadron in the University of London has been approved by the Senate and sanctioned by the Air Ministry.

## THE FLIGHT TO SINGAPORE

The three Short "Singapore" destined for No. 205 (F.B.) Squadron were detained for some days at Malta by bad weather, but left for Athens on February 28. They are to make a stay of some days at Basra and are due at Singapore on April 6.

## R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee of the Fund was held at Iddesleigh House on February 21. Mr. W. S. Field was in the chair and the other members of the Committee present were Mrs. L. M. K. Pratt Barlow, O.B.E., and Wing Commander H. P. Lale, D.S.O., D.F.C. The Committee made grants to the amount of £133 14s. 7d. The next meeting was fixed for March 7.

## AIRCRAFTMAN T. E. SHAW

A/C. Shaw (formerly Col. Lawrence) is due for discharge from the Royal Air Force on March 11, on completion of twelve years' service, the first part of which was with the Royal Tank Corps. He is at present on discharge leave.

## OFFICERS TO SPECIALISE

The following officers holding permanent commissions have been selected to attend specialist courses during 1935-36:—

ENGINEERING.—F/O's. J. M. D. Ker, R. Faville, G. L. Best, A. Pyke, N. C. S. Rutter, and F. E. Stokes (September, 1935); E. R. Pearce and R. G. Shaw (January, 1936), all to join the Home Aircraft Depot, Henlow.

ARMAMENT.—F/O's. C. H. B. Bullock, M. F. D. Williams, R. H. E. Emson, A. H. Fear, and A. W. Geoghegan (March, 1935), to join the Air Armament School, Eastchurch.

SIGNALS.—F/O's. A. D. Messenger, R. Monks, A. McIlwaine, F. C. Daubney, G. H. O. Mills, and N. G. Goodman (April, 1935), to join the Electrical and Wireless School, Cranwell.

NAVIGATION.—F/O's. G. J. L. Read, L. F. Brown, and W. E. Oulton, P/O. W. S. Jenkins (January, 1936), to join the R.A.F. Base, Calshot.

PHOTOGRAPHY.—F/O. H. P. Jenkins (January, 1936), to join the School of Photography, South Farnborough.

## EXPENDITURE ON AIR SERVICES

The Air Services Appropriation Account, 1933, with the report of the Comptroller and Auditor-General thereon, has been published by the Stationery Office (No. 33) at 1s. 3d. net. The report shows a total saving of £725,206 on the estimates for the year ended March 31, 1934. Gross expenditure was £19,201,643 against the estimate of £19,638,600—a surplus of £436,956, to which is added an excess of receipts of £288,249. The total receipts amounted to £2,500,849, as compared with the estimated sum of £2,212,600, an excess of £288,249 (13 per cent.), arising mainly from an unanticipated receipt of £150,000 for sale of land at Hendon to the Metropolitan Police, and an increase of £102,000 in the contribution from the Government of India in respect of home effective services.

## ROYAL AIR FORCE GAZETTE

London Gazette, February 26, 1935

## General Duties Branch

The following Flying Officers are promoted to the rank of Flight Lieutenant:—P. E. Hudson (Dec. 28, 1934); F. C. Cole (Jan. 27); S. S. Murray (Jan. 27); J. Mutch (Jan. 28); A. D. Selway (Jan. 29); J. A. H. Loudon (Jan. 30).

The following Pilot Officers are promoted to the rank of Flying Officer:—D. N. Kington-Blair-Oliphant (Sept. 17, 1934); E. Shipley (Oct. 3, 1934); T. L. Moseley, G. N. Hancock, K. A. Stewart, A. H. Jarand, H. R. Tidd, P. L. Donkin, A. C. P. Carver, J. A. P. Owen, D. H. Spencer, P. W. Bale, M. A. Aylmer (Jan. 15).

Wing Cdr. L. M. Bailey, A.F.C., is restored to full pay from half-pay (Feb. 16). Wing Cdr. J. J. Breen is placed on the half-pay list, scale A (Feb. 20), and restored to full pay (Feb. 21).

The following Flying Officers are transferred to the Reserve, Class A (Feb. 21):—F. G. L. Bain, L. T. G. Barber, G. S. Barrett, G. A. C. Foster, C. A. M. Kyrke-Smith, M. P. Price.

## Medical Branch

Flt. Lt. J. A. Kersley, M.R.C.S., L.R.C.P., is granted a permanent commission in this rank (Feb. 27).

F. O. W. P. Stamm, M.B., B.S., M.R.C.S., L.R.C.P., is promoted to the rank of Flight Lieutenant with effect from Jan. 8, and with seniority of May 1, 1934.

## ROYAL AIR FORCE RESERVE

## Reserve of Air Force Officers

## General Duties Branch

W. B. Wilson is granted a commission as Flying Officer in class A

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

## General Duties Branch

Wing Commanders.—L. M. Bailey, A.F.C., to No. 2 Armament Training Camp, North Coates Fitties, 16.2.35; to command. B. E. Baker, D.S.O., M.C., A.F.C., to H.M.S. *Eagle*, 4.2.35; for duty as Senior Air Force Officer vice Wing Cdr. J. M. Robb, D.S.O., D.F.C. H. M. Probyn, D.S.O., to Headquarters, R.A.F., Middle East, Cairo, 4.2.35; for Equipment (Engineer) Staff duties vice Group Capt. K. C. Buss, O.B.E. W. H. Dunn, D.S.C., to No. 230 (F.B.) Squadron, Pembroke, 23.2.35; to command.

Squadron Leaders.—R. M. C. Macfarlane, M.C., to No. 31 (Army Co-operation) Squadron, Quetta, India, 21.11.34; to command vice Sqn. Ldr. C. J. S. Dearlove. K. H. Riversdale-Elliott, to No. 27 (B) Squadron, Kohat, India, 28.11.34; to command vice Flt. Lt. F. H. Isaac. C. L. King, M.C., D.F.C., to No. 3 Armament Training Camp, Sutton Bridge, 18.2.35; to command.

Flight Lieutenant.—F. W. Stannard, to No. 5 Flying Training School, Sealand, 23.2.35.

Flying Officers.—W. J. Brighty, to School of Naval Co-operation, Lee-on-the-Solent, 21.2.35. J. R. Watson, to School of Naval Co-operation, Lee-on-the-Solent, 21.2.35.

Pilot Officer.—J. N. Tomes, to No. 208 (Army Co-operation) Squadron, Heliopolis, Egypt, 5.2.35.

Acting Pilot Officer.—D. P. Frost, to No. 14 (B) Squadron, Amman, Transjordan, 4.2.35.

## Stores Branch

Wing Commander.—G. A. Hilliar, to Headquarters, Coastal Area,

## AIRCRAFT FOR FLEET MANŒUVRES

Covering an area east and west of the Straits of Gibraltar, the manœuvres of the Home and Mediterranean Fleets from March 7 to March 15 will be particularly interesting this year because of the part which the aircraft of the Fleet Air Arm will be able to play.

A feature of these manœuvres is the participation of all merchant shipping in the area covered. These ships will take their "nationality," for the purpose of the manœuvres, from the area in which they are at midnight on March 7-8. Thus, any west of longitude 12 deg. W. will be considered as belonging to "Redland," and any east of 11 deg. W. as belonging to "Blueland."

The "Redland" commander (Admiral Lord Cork) will have two aircraft carriers, the *Courageous* and the *Glorious*, under his command, carrying the following aircraft:—No. 800 (Fleet Fighter) Sqn.; No. 810 (Fleet Torpedo-Bomber) Sqn.; Nos. 820, 821, 823 (Fleet Spotter-Reconnaissance) Sqn., in the *Courageous* and No. 801 (Fleet Fighter) Sqn.; No. 811 (Fleet Torpedo-Bomber) Sqn.; No. 822 (Fleet Spotter-Reconnaissance) Sqn., in the *Furious*. This makes a total, if the squadrons are up to full establishment, of ninety-six aircraft.

The "Blueland" commander (Admiral Sir William Fisher) has only the *Eagle*, which carries No. 812 (Fleet Torpedo-Bomber) Sqn., and No. 825 (Fleet Spotter-Reconnaissance) Sqn., making a total of twenty-four aircraft.

As the area is so far south, the weather likely to be encountered should permit of the full use of aircraft throughout this period, and it will be interesting to see to what extent they are able to assist in defending their respective fleets and the merchant shipping in their area.

Some indication of the number of merchant ships involved can be gained from a census taken recently, which showed that there were eleven liners and forty-four "tramps" in the area at one time.

## SPECIAL RESERVE

## General Duties Branch

F/O. W. B. Wilson resigns his commission (Dec. 29, 1934).

## AUXILIARY AIR FORCE

## General Duties Branch

G. W. Garnett is granted a commission as Pilot Officer (Feb. 5).

## AUXILIARY AIR FORCE RESERVE OF OFFICERS

## General Duties Branch

H. N. St. V. Norman (Lt., Royal Corps of Signals, R.A.R.O.) is granted a commission as Squadron Leader in class A (Dec. 1, 1934).

## TERRITORIAL ARMY

## ROYAL ENGINEERS

## Anti-Aircraft Searchlight Battalions

26TH (LOND.) A.A.S. BN. (L.E.E.).—Sec. Lt. M. J. Darch to be Lt. (Feb. 27).

Lee-on-the-Solent, 22.2.35; for Equipment (Stores) Staff duties vice Wing Cdr. W. E. Aylwin, O.B.E.

Squadron Leader.—E. L. Ridley, to Headquarters, Fighting Area, Uxbridge, 25.2.35.

Flight Lieutenants.—G. J. Gaynor, to Administrative Wing, Cranwell, 20.2.35. C. J. Nobbs, to No. 2 Flying Training School, Digby, 22.2.35.

Flying Officers.—V. H. B. Roth, to No. 2 Stores (Ammunition) Depot, Altrincham, 18.2.35. E. J. H. Starling, to Home Aircraft Depot, Henlow, 18.2.35. T. King, to No. 4 Stores Depot, Ruislip, 25.2.35.

## Accountant Branch

Squadron Leader.—A. W. Gray, to No. 2 Flying Training School, Digby, 15.2.35; for Accountant duties.

Flying Officer.—W. M. Lyons, to No. 16 (Army Co-operation) Squadron, Old Sarum, 25.2.35.

## Medical Branch

Group Captain.—T. J. Kelly, M.C., to Princess Mary's R.A.F. Hospital, Halton, 6.3.35; for duty as Commanding Officer vice Group Capt. F. C. Cowtan.

Squadron Leader.—F. E. Johnson, to Station Headquarters, Hendon, 18.2.35; for duty as Medical Officer.

Flying Officer.—H. Bannerman, to No. 47 (B) Squadron, Khar-toum, Egypt, 1.2.35.

## Dental Branch

Flying Officer.—A. Maben, to No. 1 School of Technical Training (Apprentices), Halton, 18.2.35.



## PRIVATE FLYING

LORD SEMPILL, CONTINUING THE STORY OF HIS AUSTRALIAN FLIGHT, DESCRIBES HIS LANDING ON BATHURST ISLAND AND A NIGHT SPENT IN THE AUSTRALIAN BUSH

MY landing on Bathurst Island was facilitated by the enterprise of the priest in charge of the Mission there, who some time previously got the natives to make a clearing near the mission house. Owing to the fact that I had altered my course several times to avoid the worst of the storm during the crossing of the Timor Sea, I struck land too far south, but was able to find the site and make a good landing. Soon after the ground was cleared Imperial Airways' air liner *Astræa*, during her pioneering trip to Australia, put down at this spot owing to shortage of petrol. It was a godsend on that occasion, and makes a very good emergency landing ground for those similarly placed in making the long sea journey.

I had heard of the wonderful work being done by the mission here, and had intended to spend a night in any case. The priest in charge is Father Gesell, of Strasbourg, who has been there for twenty-six years. He has about a thousand aborigines under his care, and is doing fine work. The island is about eight hundred square miles in area and quite wild, and is inhabited by natives of perhaps the oldest race on earth, still in the quite natural state. I was glad to spend the night here and rest before going on to the mainland, as I knew I should not have much time for repose once I reached Australia. I was very kindly entertained by Father Gesell, and was put up in a little wooden building which serves as a guest house. The next morning I attended a service in the church, at which two native boys assisted. The singing of the fifty children—in Latin and English—was quite good and a credit to those who are giving their life to this wonderful work.

### The Hop to Darwin

I WAS just preparing to make a start for Darwin when a D.H. "Moth," which had been very kindly sent over by the Vacuum Oil Co., landed to see if I was all right. Apparently the signal sent from Koepang, although it had reached them, had not been very clear as to my intention to stop the night at Bathurst Island. They brought my mail which, of course, was mostly from Australia, and contained numerous hospitable invitations.

Taking off on the short sea crossing, I arrived at Darwin and received a very kind welcome. The aerodrome has a level grass surface, but is, I understood, liable to become boggy after rain. It is 680 yards from north to south and 1,000 yards from east to west. There is a well-equipped meteorological office and a new shed was just being built. The Danish pilot, Lieut. Hansen, who had put up such a good performance in the MacRobertson race in an old Desoutter, was here on his return journey. He was hurrying home as he had only been given leave from his military duties until December 10. He had done some hard flying on the outward trip, putting in, on some sections of the route, sixteen hours a day.

The opening of the Singapore extension gives an added importance to Darwin, which will be more and more recognised as time goes on. The feats of British and Australian air pioneers have, in recent years, focused the attention of the world on this town, which has been the goal and starting point of many wonderful flights to and from the

## Landings in Strange Places

Mother Country. The fact that the majority of these have been accomplished on light aircraft as we know them is not only a tribute to the endurance of the pilots, but has reflected great credit on our designers and on the British aircraft industry generally. The machines available to the owner pilot in this country to-day cannot but have benefited greatly from the thorough testing their fore-runners have received as a result of these remarkable performances. The Australian Government have plans in hand for the improvement of the aerodrome facilities at Darwin which include the provision of direction-finding and night-flying equipment.

### Drawing Up Plans

WHEN I arrived at Darwin I had not finally decided on my Australian itinerary, so that I stayed over the following day planning my route. It was my original intention to proceed down the western coast and return by the eastern states. I also wished to visit New Guinea as there was much of interest in the flying development in that country. As, however, I had lost a good deal of time owing to the delayed start from home, I decided I must make Melbourne by the quickest route. I therefore mapped my course direct through the interior of northern territory and South Australia to Adelaide. The course taken lay *via* the present trunk air route as far as Newcastle Waters and from thence to Alice Springs and Tennants Creek, which involved about a thousand miles' flying, which I hoped to accomplish before dark. As dusk set in when I had still ninety miles to go, I decided to land rather than risk losing my way.

In any case, when I eventually arrived I found the aerodrome at Alice Springs quite tricky, so was glad I had not attempted night landing. As I had not originally intended to take the route followed I was not prepared with maps and had been navigating from an Admiralty chart which did not give much in the way of detail. I had not much difficulty in keeping to the course, however, as there is a telegraph line running straight through the centre of the continent, but it was not easy to determine just where one was.

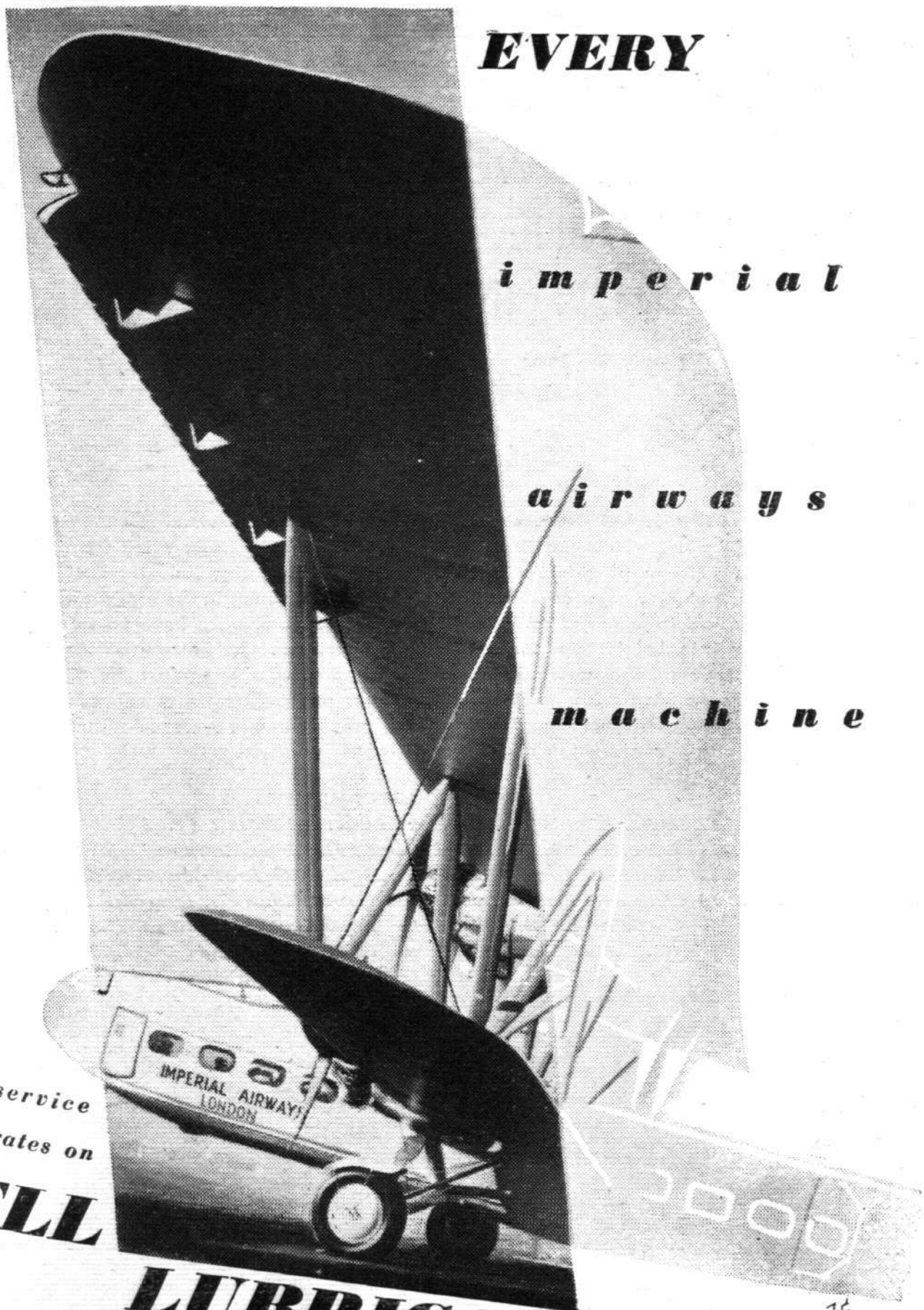
### Down in the Bush

I FOUND on landing that I had come down in the bush near Ryans Well. It was quite a good place and close to the overland telegraph line, but it was well that I had landed in the light as there are large ant-hills all over the plains. I ate some sandwiches I had brought from Darwin, and being rather tired I slept for a little time in the machine. When the moon came up I did a little exploring and came across a deep well with a hand winch. After a struggle I was able to draw up a bucket of water and wash by moonlight in the dead centre of Australia!

The next morning I flew on to Alice Springs and found that the people had been out looking for me in cars. They were immensely hospitable, and I was sorry to have given them the trouble of searching for me. They did not appear to mind, however, and seemed to think it all good fun.

As I had had little rest the night before, I decided to spend the day at Alice Springs, which is at the railhead of the line running from the south of the continent, and get a good sleep before continuing next morning to Adelaide and Melbourne.





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# FROM THE CLUBS

*Events and Activity at the Clubs and Schools*

## CASTLE BROMWICH

Flying times last week were 8 hr. 20 min. dual and 8 hr. 10 min. solo. Mr. Carr flew over from Cambridge in a "Moth," and one cross-country flight was made to Hatfield.

## LIVERPOOL

The third of a successful series of "treasure hunts" and informal dances was held, with great success, at the clubhouse at Speke on Saturday, March 2. During February 95 hr. 15 min. flying time was recorded, 35 hr. 45 min. being flown last week, in spite of high winds and gales.

## HESTON

The Heston First Solo Cup is now garnished with more than 250 signatures, though it was not instituted until three years after the flying school started operations. It is made of old tins, and has now been vastly improved in appearance by a model of an Airwork "Cadet," made by the Model Transport Co., and mounted in a climbing turn on the top of the cup.

## CINQUE PORTS

The club announces that Col. Shelmerdine, Director of Civil Aviation, and Mrs. Shelmerdine have accepted an invitation to the annual dinner and dance on March 15. Mr. C. W. A. Scott has also promised to be present.

Mr. Jackson, late of the College of Aeronautical Engineering, has joined the staff as assistant ground engineer, and Mr. Wedderburn, also of the College, is at Lympe finishing his course with six months' practical experience in the maintenance of aircraft. Mr. Dermot Neill has joined the club to take his "A" licence.

During most of the week the weather has been unkind, and flying time, dual and solo, amounted to only 15 hours.

## LEICESTERSHIRE

The success of the Leicestershire Aero Club has been phenomenal since it first started, and not a little of this success is due to the excellence of the club's social functions. The dance held last Friday evening was fully up to the usual standard and must have been attended by at least five hundred people.

The club has to a certain extent been handicapped for the last few months by the fact that they have been using Desford aerodrome for flying and their new clubhouse at Braunstone for social purposes. However, it is expected that this new aerodrome will be opened for flying in the near future. It will be remembered that the official opening had to be delayed last year owing to the surface having had insufficient time to get into condition. This delay has been all to the good, and the enormous amount of work which the En-Tout-Cas Company have done will probably show to greater

advantage than if the aerodrome had been used at the time.

Aerodrome preparation is really an extremely interesting subject and one about which a very great deal could be written. The figures in particular are more often than not astounding; for example, although the acreage at the new aerodrome is only eighty at present, over 50,000 cubic yards of material had to be removed for levelling purposes, and one end of the aerodrome is now as much as thirteen feet above the original level of the ground at that point. It is almost square in shape and gives runways in any direction of over 600 yards, with something like 800 yards across the diagonals. The municipality have, very wisely, reserved a great deal more of the surrounding ground so that the runways can be extended to 1,000 yards when necessary.

## HERTS AND ESSEX

Persistent bad weather has continued to hamper flying, but flying hours last week amounted to 38 hr. 20 min. dual and 18 hr. solo. The flying for February totalled 145 hours.

The competition for the Alexander Clark Trophy, which takes place next Sunday, will be a landing contest. This should prove a very interesting event, and a record number of entries have already been received.

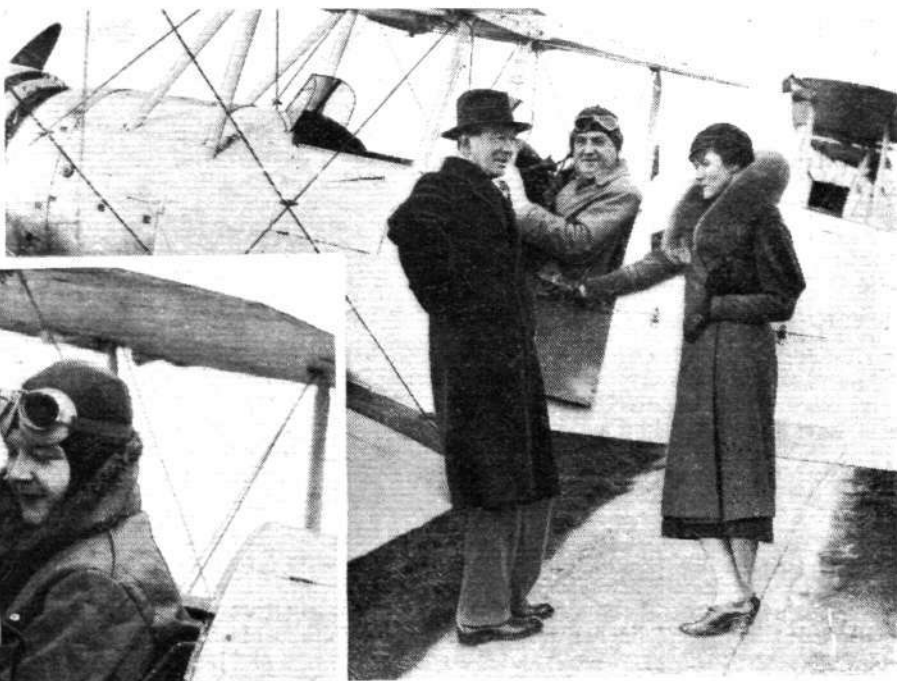
## NORTH STAFFS

The Stoke-on-Trent City Council has agreed to allow the North Staffordshire Aero Club to have a clubhouse at Meir aerodrome. The site has been decided upon between the City Aerodrome Committee and the club, which has been given a lease for a term of seven years, and permission to erect a temporary clubhouse, subject to the plans being satisfactory. It has also been decided to make a public enclosure near the entrance to the aerodrome.

## YORKSHIRE

Publication of particulars of the new Aviation Group Scheme promoted by the club has brought numerous enquiries. The scheme facilitates the payment of flying training fees by enabling members to pay in weekly sums according to the depth of their pockets.

Eighteen hours were flown during the week, making a total of 55 hours for February, which is an increase of 22 hours over the total for February, 1934. Members flew to London and Doncaster, and Mr. Somerset visited the club in a Klemm.



**SNAPPED AT HESTON:** On the left, Capt. V. H. Baker, Airwork's Chief Instructor, is seen with Mrs. Lilian Hartigan Gibbs, who is learning to fly before leaving for Rome. Above is Mr. Filson Young, of "broadcast flying lesson" fame, between Mr. Edward Proctor and Mrs. Dod Proctor, the artists.



## Private Flying

### NEWCASTLE

The Newcastle-upon-Tyne Aero Club, Ltd., has received approval from the Air Ministry to give instrument flying instruction.

### READING

Flt. Lt. "Tommy" Rose had his new demonstration "Hawk Major" out during the week-end. This machine, of course, has flaps, and is finished in dark blue and white. The large factory extension of Messrs. Phillips and Powis is rapidly taking shape, and the Service Department at the east end of the aerodrome has already doubled its size.

### YORK COUNTY

Forty-one hours were flown at Sherburn-in-Elmet by the York County Aviation Club during February. Eight flying members joined, and the club has ordered two new Avro "Cadets."

Arrangements are being made to hold a flying meeting early in June, to which foreign pilots have been invited. There will be a dance at the clubhouse on Saturday.

### NORTHAMPTONSHIRE

One new member joined last week—Mr. J. Davis. On the fine days quite a number of members turned up to fly, although the weather on the whole was unfavourable.

The club's dinner, which is organised for the 9th, and at which Mr. Charles Scott is being entertained, is receiving good support.

### GUERNSEY

The first annual general meeting of the Guernsey Gliding and Sailplaning Club was held recently, when the report of the committee on the year's working proved most satisfactory. It showed that, despite several mishaps to the club's "Scud I," members were still keen, and had, in fact, benefited by the practical experience gained in the repair shop. It is hoped, besides having the glider in use again shortly, to acquire in addition a primary model for instructional purposes, which is also to be built by the members. Mr. C. H. Adey, La Vallee, Oberlands, St. Martins, Guernsey, was appointed secretary.

### HARROGATE

The S.T. glider, which was built by the Aircraft Club, Harrogate, has now done six months' work, and has been out almost every week-end with an average of forty launches every Sunday.

Membership has steadily increased in the past year, during which arrangements were made for dual "power" instruction at Yorkshire Air Services school. One of the members, Mr. H. L. Brook, who obtained his earliest experiences on the club's Dickson glider, entered the Melbourne race with a Miles "Falcon," and is now flying in Australia after a troublesome trip.

### HANWORTH

Mr. "Tim" Wood, returning from Switzerland in a D.H. "Rapide" with Mr. C. R. Anson, made the following times: Paris to Zurich 2 hr. 10 min., Paris to Heston 80 min., and Paris to Croydon 69 min. The machine has been away for nine days. Mr. L. Beardmore left on Thursday last in his Junkers with a party of friends for the Saar. On Thursday Mr. B. Yamamoto returned from Switzerland in the "Satyr." Mr. M. John has gone solo, and Mr. L. Falk has renewed his "A" licence.

Hanworth has been provisionally approved by the Air Ministry to give instruction in blind flying. The instructor approved is Flt. Lt. R. Duncanson, and the approved aircraft is a Blackburn B.2 Trainer, with complete blind flying equipment and a hood on the port side. This machine, of course, is identical with the type used for Reserve training at Brough.

### BENGAL

The flying return for January, which shows a total of 122 hr. 50 min. flying (66 hours of which represents "solo") proves the increased interest of members in flying. During the month three members commenced taking dual instruction, one passed his "A" licence tests, and another made his first solo. Cross-countries were made to Khargpur and Jamshedpur.

The club's instructor, F/O. K. D. Knocker, flew to Panitola, in Assam, a distance of more than 550 miles, with Mr. W. W. K. Page, President of the European Association, as has passenger. Two stops were made, at Dacca and Cinnamara, on the outward journey, and only one stop, at Dacca, on the journey home.

The latest returns show that of the 277 members, 145 are Indian. Two club aircraft are in commission, and there are four privately owned machines.

### BROOKLANDS

A dinner and dance was held at the Brooklands Flying Club on Saturday, February 23. New members last week included Messrs. Truscott, Dudley, and Iliffe. Messrs. Fox and Machin made first solos. Visitors included Mr. R. O. Shuttleworth, who came down in the "Dragon" which formerly belonged to the Prince of Wales.

### BRISTOL

It has been decided to hold the race for the S.B.A.C. Challenge Trophy at Bristol Airport on Saturday, June 15. The provisional course chosen is Bristol Airport (Start)-High Post-Witney-Bristol Airport (Finish). Entry forms will be obtainable from the Manager, Bristol Airport.

The clubhouse committee is considering an extension of the clubhouse bar, and the installation of a quick-luncheon counter.

### CAMBRIDGE

Flying times at Marshall's Flying School and the Cambridge Aero Club for the week ended March 1 were dual 26 hr. and solo 6 hr. 40 min.

First solos were accomplished during the week by Mr. Guest of the Civil Aviation Service Corps, and Mr. Scott. Nine C.A.S.C. members flew on Sunday. Guest was their third soloist. Several machines visited Fen Ditton, including one weather-bound "Vildebeest."

### HAMPSHIRE

Provisional approval for blind flying instruction has been granted by the Air Ministry to the Hampshire Aeroplane Club. Mr. K. C. Winton has been approved as a blind flying instructor, and one of the club's machines has been fitted with Reid and Sigrist blind flying instruments.

During February the club's five aircraft flew 90 hr. 30 min. There were three new members, and Messrs. A. P. T. Pierssené and G. B. Miller made "first solos."

### HATFIELD

The flying time at the London Aeroplane Club for last week was 41 hr. 30 min. New members were Miss L. H. Clower, Canon C. E. Hudson, Messrs. R. D. Morrison, F. J. Bush, C. L. Richardson, and D. Cameron. The Club has been approved for passing pilots in their blind flying test since February 5, and Mr. D. Cameron obtained certificate No. 1 on February 26. Such instruction is given by Flt. Lt. J. A. Harris, Flt. Lt. G. H. W. Selby-Lowndes, and Mr. J. Good-year, all of whom have done the C.F.S. instructor's course. A "Tiger Moth" with blind and night flying equipment has been in use for six months, and another is now being equipped for blind flying.

During the week Lt. H. Hopson Hill became a member of the Royal Air Force Flying Club.

Owing to a misunderstanding, an error appeared in last week's news. The sentence in question should have read: "Among membership facilities . . . officers of the Auxiliary Air Force, otherwise eligible, were admitted to membership without entrance fee." The annual subscription for these members is £2, payable half-yearly if desired.

### South Coast Aero Club

As soon as the new aerodrome for Brighton, Hove and Worthing is ready the old Southern Aero Club will be renamed South Coast Aero Club and will be managed by Brooklands Aviation, Ltd., presumably under the interchange of membership arrangement which applies to members of Brooklands, Lympne and Northampton.

### A Dublin Opening

At 3 o'clock on Saturday afternoon the Lord Mayor of Dublin, Alderman A. Byrne, T.D., officially opened Kildonan aerodrome and wished the new operating company, Dublin Air Ferries, Ltd., the usual good things. Ireland, he said, had one of the brightest flying prospects in the west of Europe, and there were already a number of flying organisations in the Free State. Dublin Air Ferries followed Iona National Airways and Everson Flying Services in the occupation of the aerodrome and both the previous tenants had been successful in their operations. He told the company that Dublin would do everything possible to help them.

Before the opening, a formation of machines belonging to the Irish Aero Club and D.A.F. had flown over and there were eleven visiting machines on the airport, including a Monoplane from England. Some 2,000 people were present and, in three hours, more than 100 made flights, four new pupils joined the school and three charters were booked for the following week.

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PARIS, Air Port	...	...	...	...	dep.	10.45
BASLE, Air Port	...	...	...	...	arr.	13.30
BASLE, Air Port	...	...	...	...	dep.	13.45
ZÜRICH, Air Port	...	...	...	...	arr.	14.20
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LONDON, Airway Terminus dep.	*07.15	*08.15	10.15	*11.15	11.15	*11.15
LONDON, Air Port ... dep.	*08.00	*09.00	11.00	*12.00	12.00	*12.00
BRUSSELS, Air Port ... arr.	09.15	—	—	13.40	14.15	13.15
BRUSSELS, Air Port ... dep.	09.30	—	—	13.55	14.30	13.30
COLOGNE, Air Port ... arr.	10.15	11.25	13.25	14.45	15.45	14.15
COLOGNE, Air Port ... dep.	—	11.45	13.45	—	—	—
HALLE/LEIPZIG, Air Port arr.	—	13.40	15.40	—	—	—
HALLE/LEIPZIG, Air Port dep.	—	13.50	15.50	—	—	—
PRAGUE, Air Port ... arr.	—	14.55	16.55	—	—	—
PRAGUE, Air Port ... dep.	—	15.10	17.10	—	—	—
VIENNA, Air Port ... arr.	—	16.30	18.30	—	—	—
VIENNA, Air Port ... dep.	—	16.45	18.45	—	—	—
BUDAPEST, Air Port ... arr.	—	18.00	20.00	—	—	—

NOTE \* The times shown for departure will be one hour earlier during the period 1—13 April inclusive, owing to Summer time coming into force in Belgium 14 days ahead of its introduction into England.

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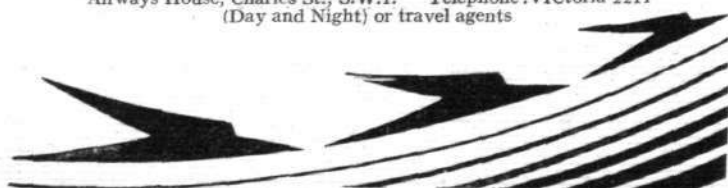
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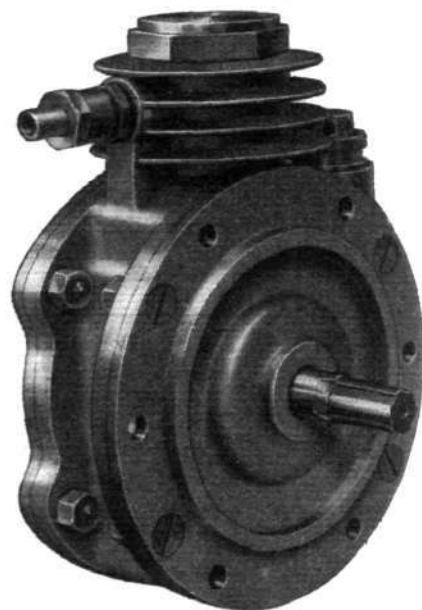
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# COMMERCIAL AVIATION

## AIRLINES — AIRPORTS —



GOLD RUSH : This particular Short "Scion," fitted with floats, is to be used for gold survey in Papua. (*Flight* photograph.)

### CROYDON

*Time-table Changes : The Need for Roofed Platforms : Surrey Flying Services' Year :  
Where are the Alternative Airports? : The New Control Scheme—with Examples*

ON March 1 several changes of time-table were made. On K.L.M. routes an extra service each way was put on, and the 7.0 a.m. departure now runs to Berlin and Scandinavia. The return machine arrives at 8.30 p.m. Air France shows an additional service each way also, leaving both London and Paris at 3.30 p.m. Spartan Air Lines has an extra service each way on the Isle of Wight route. Other companies show no change other than alterations in the times of existing services.

Wednesday, last week, was a day of gales, snow, sleet, and ice formation, and the month certainly "went out like a lion." On that day, too, I noticed that Air France and K.L.M. loaded passengers and baggage inside their hangars—which was as well, considering that one could hardly stand against a gale which carried snow and sleet. The time will come when a large portion of the departure platform will be roofed like a railway station so that passengers can keep dry when embarking and disembarking. If pilots need to run up their engines before departure they could obviously taxi away from the roofed platform before so doing.

Scylla has been away at Rochester for a couple of weeks and has now returned with an alteration to the servo rudder, which is now incorporated in the rudder itself instead of protruding backwards. Mr. Lankester Parker, Short's test pilot, brought the machine to Croydon one day last week. A new D.H.86, *Dorado* by name, was delivered last week to Imperial Airways. This machine is fitted with dual control, unlike the other Imperial machines of the same class.

The Surrey Flying Services' statistics for 1934 show an increase of 408 hours over the previous year's total. The 1934 figure was 2,235 hours of commercial and instructional flying. The amount of joy riding has steadily increased, but photographic flying hours were rather lower. It is interesting to note that this is put down to the greater use of wireless and telegraphic transmission for Press photos. Nevertheless, I still see whole droves of Press motor cyclists leaving the airport gates like so many horizontal rockets every time special pictures are received from abroad. Surrey's have had twenty-one "A" licence pupils in 1934, of whom four are continuing for "B" licences—including three women. I understand that this firm is so pressed with maintenance work that there is actually a small waiting list.

Sir John Simon flew to Paris last Thursday by Imperial Airways and returned on Friday. He will fly to Berlin next week

by D.L.H., accompanied by Lady Simon, who was at Croydon last week.

The Air Ministry's "Notice to Airmen" (No. 3 of 1935) concerning radio organisation on the London-Continent Airway area serves to show how complicated traffic control has become. For example, "ZZN" means "you are not to land here," but there is no signal at present for "you may land at one of the alternative airports with adequate facilities"—which airports were promised by the Authorities when the controlled zone was agreed to by the operating companies. Presumably the signal will be invented when and if such very necessary alternative airports have the necessary equipment. At present, I believe, neither Gatwick nor Gravesend have really suitable equipment, although late flying aircraft may need either of these aerodromes on any night of the week.

Incidentally, this "Notice to Airmen," in which is given some amusing examples of how the control zone scheme works, tells one aeroplane to hover in the vicinity of Penshurst until further notice. This example may have seemed simple when dictated in a cosy Whitehall office, but the pilot has to do it in really bad weather with a machine full of worried passengers. Anyway, why hover near Penshurst? It is useless as an aerodrome, for Customs' facilities are such that the local officer will only attend in due course, provided that he is not hunting for illicit stills at the other end of the county. Another mythical aeroplane gets lost, cannot find Croydon, and is sent back a number of moves in disgrace. The document concludes with a verbal vision of this aeroplane sinking in to Croydon. "At 11.18 aircraft A-BCDE lands at Croydon. . . . By direction of the Secretary of State." A. VIATOR.

### The Assam Service

Work in connection with the projected Assam-Calcutta service is going ahead rapidly. Indian National Airways propose to operate from Dacca, which is now connected by air with Calcutta, to Dhubri, Tezpur, Dibrugarh, Silchar, and back to Dacca. Sonaville, nine miles from Tezpur, has been selected as Assam's airport, and a site, as recorded in *Flight*, has been set apart.

Indian National Airways took delivery of the ex-Viceregal Avro Ten last year, but this is used on their Bengal-Burma service.



**Commercial Aviation****HESTON*****Wireless for Heston : Airwork Blind Flying : A Change of Name : Air Transport in Miniature***

**A**RRANGEMENTS have been made with the Air Ministry for the erection of a group of wireless stations in the vicinity of Heston Airport for ground-to-air and point-to-point communication. Further particulars will, no doubt, be published in the "Notices to Airmen" as the various services become available.

Airwork, Ltd., has received Air Ministry approval as an instrument flying school. Under Mr. Brian Davy a number of pupils have already taken complete courses on a "Cadet" equipped with Reid and Sigrist instruments. The final tests include spins and extricating the aeroplane from awkward positions, and culminate in a hooded flight over a triangular course of fifty miles, which must be terminated within gliding distance of the aerodrome. An unofficial certificate is then issued. The cloud-flying area at present reserved for Airwork pupils extends north to Northolt, west to High Wycombe and Henley, and south almost to Brooklands. Only one pupil at a time is allowed to practise cloud flying in this area, and aircraft from other schools keep clear of the clouds within its boundaries.

The Heston firm of Wrightson Aircraft Sales, Ltd., who are agents for the British Klemm Aeroplane Co., will now be known as Malcolm and Farquharson, Ltd. The directors of the company are Mr. G. A. R. Malcolm, Mr. G. G. W. Farquharson and Mr. A. G. N. Wynne-Eyton.

***To the Western Isles***

Northern and Scottish Airways are now running a daily service to Islay and Campbeltown, leaving Renfrew at 9.30 a.m. Incidentally, West of Scotland Airways keep a "Fox Moth" at Renfrew for charter purposes.

***Across Africa***

Imperial Airways are to link British West African colonies with the South African trunk route by a weekly service, each way, between Khartoum (Sudan) and Maidugari (North-Eastern Nigeria). Feeder lines may be operated by a local company *via* Kano to Lagos, Accra and Takoradi, with an extension to Freetown (Sierra Leone) in due course.

***The Island Ferry***

Separate ferry services to Shanklin and Ryde will be run from Portsmouth during this season by P.S. and I.O.W.A. Last year a round trip was made. The Brighton, Portsmouth and Bournemouth service will be reopened in the spring, and the company proposes to use three Airspeed "Couriers," and an "Envoy" in due course. Incidentally, the Airspeed Company is making experiments with controllable pitch air-screws, and an "Envoy" so fitted has been on test.

***Bedfordshire Enterprise***

For several years Mr. R. O. Shuttleworth, the Bedfordshire private owner, has used an aerodrome and workshop on his own estate at Old Warden, some two and a half miles west of Biggleswade, on the Great North Road. In June of last year the business was registered under the name of the Warden Aviation Co., with Mr. A. J. Edmunds, an "A" and "C" ground engineer's licence-holder and a "B" licence pilot, as partner, and with Mr. Jackson as chief engineer.

Before and since that time the company has been specialising in maintenance and charter work, but now they propose to make charter their primary business and to use the workshop and aerodrome at Warden as a maintenance base, and Heston as their terminal aerodrome. An office in the new building will shortly be ready for occupation.

The fleet at present consists of three Desoutters, with Hermes and Gipsy engines, a D.H. "Dragon," wireless equipped, which was previously owned by the Prince of Wales, three Comper "Swifts," one with a "Gipsy" engine, and a Cirrus III "Moth." The "Swifts" and the "Moth" are being hired to accredited private pilots at 30s. an hour, and the Desoutters and the "Dragon" can be chartered, with pilot, at £4 and £10 an hour respectively. As the Desoutters carry two passengers and the "Dragon" carries five or six, these figures are reasonable enough—they work out at about 4d. per mile per passenger.

During the remainder of the winter and in the spring the "Dragon," as explained in the Heston news in *Flight* of

On Sunday, February 24, Miss Mabel and Miss Sheila Glass took off in their "Moth" under lowering skies and canvassed five aerodromes in three and a half hours as representatives of the National League of Airmen.

Mr. J. G. Stevenson, the well-known amateur footballer, has twice lately taken a machine from Air Hire, Ltd., to fly to matches. In the first case he flew to Yeovil, but unfortunately arrived too late to play. On the second occasion, however, he was called upon suddenly to play at Twyford, and he hastened the journey from London by telephoning for a machine to be in readiness at Heston. He landed in a field in good time for the match.

In a specially designed three-roomed hut Mr. Woodason, first and chief craftsman of the Model Transport Co., carries out the more than usually intricate detail work on aircraft models. The workshop is all "true to life." The hull of a Short "Scipio" lies on a wooden jig, complete even to the rivets on the skin. A big job, this, 3ft. span or more, and destined for a Dutch museum. Next door is the paintshop, with its own electric blower motor working a spray-painting apparatus. The third room contains pigeon-holed blue prints and models awaiting the final touches, for which they are sent to Mr. Woodason at Heston. The bulk of the work is done at the London factory, and supervised by Miss Rosalind Norman, the managing director.

February 21, will be used for neon sign flying by a subsidiary company, Aeronautical Advertising, Ltd., but it will be available for charter in good time for the "rush" season. "Railton" will be the first name to appear miraculously in the heavens, and the Marconi equipment will be invaluable, when combined with the long range of a lightly-loaded "Dragon," for finding an aerodrome which is *not* bathed in mist after sign-flying operations in various parts of the country. During this year the company propose to fly to all the important road races—Mr. Shuttleworth himself, of course, is well known in the car racing world.

As one might expect after a visit to the beautifully equipped workshop and spraying shop at Warden, the Desoutters hardly look their age and have been modified considerably. Extra rubbers have been put in the legs, "doughnuts" have been fitted, special screens, giving perfect visibility under all conditions, have been designed, and one of them has a long-range tank in the centre section. Curiously enough, this deep tank, combined with the sloping screen, has considerably improved the performance of the Hermes model. Navigation lights are fitted. The equipment of the "Dragon" should require no further emphasis.

Warden aerodrome, though small, has an ample area for all normal operations, and will shortly be improved by the removal of several trees, giving clear entries and exits in most directions.

***Jersey Airways' New Base***

On Friday of last week Jersey Airways, Ltd., officially moved their maintenance department and base to Southampton Airport, Eastleigh. In due course the company will do the whole of their own maintenance work there, and the fleet, which will consist eventually of six D.H.86s, and several "Dragons," will be housed in Southampton's extensive hangar accommodation. Provincial Airways is another company which is finding, in Eastleigh, a convenient and central seat of general operations, though Croydon, of course, is still their terminal aerodrome.

Portsmouth is no longer being used by Jersey Airways, and it would seem that Southampton would now be a logical spot for a radio D/F station. Portsmouth is on the direct Heston, Alderney and Jersey route, but there will certainly be times when D/F equipment at Southampton will be invaluable to both these operating companies. The North-South run at Eastleigh is long enough and sufficiently free from tall obstructions to make blind landings on the "ZZ" system a practical proposition. Incidentally, a main line railway runs past the western boundary of the aerodrome.

Meanwhile, on the Hampshire Aeroplane Club falls the duty of entertaining passengers by air and of providing them with adequate and excellent nourishment. Eventually the Corporation will find it necessary to push their own airport and to treat it as being as vital to them as Southampton's docks.

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Commercial Aviation**FASTER TO SWITZERLAND**

*Imperial Airways and Swissair to Operate Two Services Daily : Douglas D.C.2s  
to be Used by the Swiss Company*

AS a result of an arrangement between the Swiss Air Traffic Co., Ltd., and Imperial Airways, Ltd., passengers to Basle and Zurich will be enabled, after April 1, to choose one of two services each way on every week-day. From Croydon an I.A. machine will leave at 7.15 a.m. and a Swissair machine at 12.55 p.m. The second departure will be an hour earlier until April 13, owing to differences in the French and English summer-time changes. A Swissair machine will leave Zurich at 8.15 a.m. and an I.A. machine will leave at 2.5 p.m. The Swissair service, incidentally, will call at Lille and not at Paris.

Last year Imperial Airways operated a daily service to Switzerland and return with the Short "Scylla" type, and this will probably be used during the coming season. The time-table gives an elapsed time of six and a half hours between the extreme termini. Swissair, on the other hand, have recently taken delivery of four Douglas D.C.2s from the Fokker works, and one of these will be used on their service, with single-engined Clark G.A.43s in reserve. Their time-table, with the help of a shortened route, gives a total time of less than four hours with the added advantage of a higher speed to reduce the comparative effects of strong adverse winds. So passengers will be able to choose between great comfort with moderate speed and moderate comfort with great speed. The tickets, of course, will be interchangeable.

An examination of the time-tables brings forth the interesting fact that a person will, after April 13, be able to travel from Glasgow (by R.A.S.) to Switzerland in some nine hours.

All the Swissair Douglasses are fitted with Telefunken instruments for making blind landings by the Lorenz (Telefunken) system described in *Flight* of February 14. At present this equipment will only be useful, as far as the London service is concerned, for blind landings at Zurich, where suitable



One of Swissair's new Douglas machines at Zurich.

ground equipment is installed, but these machines will also be used on services to Amsterdam and Berlin, and at both these aerodromes the Lorenz system is in use. The instruments and details, as fitted in the machine, are light and compact, and Swissair expect that Le Bourget will be arranged for this blind landing system in due course.

Connections can be made at Basle with air services to Berne and Lausanne and with train services to Lucerne, Lugano and Milan. Incidentally, Swissair operate a series of sightseeing flights over the most famous parts of the Alps, using Zurich as a base, and from Geneva a trip to Mt. Blanc can be made.

### New Equipment at Abridge

Essex airport, Stapleford Abbots, is being equipped with a new type of boundary light developed from the "Pillar of Fire" traffic guides. Not only is the pillar itself illuminated, but the beacon throws an unmistakable circle of light around the wide base, which is painted white. The beacons give way and disconnect easily if touched by the taxiing machine.

### Western Airways

Lord Apsley, who is M.P. for Bristol Central and an enthusiastic private owner, has joined the board of Norman Edgar (Western Airways), Ltd., as chairman. The board has been strengthened, also, by the election of Lady Apsley to the directorate.

### The Portuguese "Comet"

After a stormy trip to Lisbon, Macedo and Bleck are now waiting for the March moon before taking their "Comet," *Salazar*, across the South Atlantic. On the way from Hatfield they covered a devious 1,200 miles in a little over six hours, running into an entirely unexpected low-pressure area with resultant thick cloud and stormy weather. Blind flying was the order of the day, but the pilots telephoned from Lisbon to say that the fuel consumption had been lower than expected and that the "Comet" behaved admirably.

### Meteorology in the States

Important changes have recently been made in the U.S. Weather Bureau, the most important being: (1) The adoption of the "air-mass" system of analysis and forecast, and (2) the establishment of a network of stations where daily instrument flights, to record temperature, humidity, and pressure up to 17,000ft., are made.

The "air-mass" system is based on the fact that all regions have certain definite properties, and that the bodies of air concerned acquire equally definite properties, each being given a name according to the source. These names are abbreviated (e.g. Polar Canadian = Pc.), and the "fronts" provided by air movements can have their characteristics typified on weather maps without lengthy explanations. The Navy and T.W.A. were the first to apply the "air-mass" system in their meteorological statements.

### Air Survey in Papua

A Short "Scion" (two "Pobjoys") seaplane is to be used for surveying a gold concession in Papua. The contract for this survey has been placed by the Oroville Dredging Co., Ltd., with H. Hemming and Partners.

The concession is over an area of some 350 miles by 100 miles, situated north of the Gulf of Papua and along the Musgrave and Albert Victor mountain ranges. The "Scion" will be operated from bases along the Fly River, the first being at Everill Junction. Owing to the state of the gold market, quick prospecting is a vital necessity.

### Provincial's New Service

At 10.35 a.m. on Monday the first machine arrived at Southampton from Hull on Provincial Airways' new service between Hull and Plymouth. The D.H. "Dragon," flown by Mr. Scott, and carrying the Lord Mayor of Hull, Air Commodore P. F. M. Fellowes, D.S.O., a director of the company, Mr. L. W. Bateman, chairman of the Hull Airport Committee, and Capt. Norman Macmillan, left again at 10.50.

Very shortly afterwards the London-Plymouth machine left Southampton with the Mayor of that city, Alderman Mrs. Foster Welch, Alderman Woolley, Mr. L. F. Payne, the airport manager, and Mr. A. Thomas, the managing director.

Both machines arrived at Plymouth on time, and a luncheon party was held at the George Hotel, Roborough. Fortunately enough, there was no bad weather to shake the confidence and the interior arrangements of the many distinguished passengers.

According to present K.L.M. arrangements, the Provincial service will not be enabled to make a connection with the machine incoming from Amsterdam, but there must be a number of people in Hull, Nottingham and Leicester who, week by week, wish to reach Southampton and the West easily and quickly. Once the service is known there should be a reasonable amount of traffic, quite apart from the holiday-travellers who will undoubtedly use the service during the summer. At present Desford is being used for Leicester, but the new aerodrome at Braunstone, with night landing equipment, will shortly be ready. Incidentally, the company has recently secured a twelve months' option on a sixty-six acre site at Great Hill, Osgill, two miles from Newton Abbot.



## AIR POST STAMPS

By DOUGLAS B. ARMSTRONG

(Editor of "Stamp Collecting," etc.)

THE year of the King's Silver Jubilee promises to be one of exceptional activity so far as British air mails are concerned. First of all it will witness the inauguration of a number of new inland air mail services in Great Britain itself, with the inevitable crop of first flight covers, with or without souvenir markings. Then preparations are being made to revive the famous London-Windsor air post which functioned at the time of His Majesty's Coronation in 1911, and in this connection it is proposed to provide distinctive cards and envelopes similar to those which were carried by Gustav Hamel, Grahame White, and the other pioneer aviators who operated the experimental service for one week only with the sanction of H.M. Postmaster-General twenty-four years ago.

Next there is talk of a special Silver Jubilee air mail, to be despatched in special bags, to fifty different points within the British Empire overseas as part of the official celebrations, and in this case also souvenir cards and covers are projected.

On the other hand it seems fairly certain that air mail stamps will not be included among the special issues to be made throughout the Empire on the occasion of the Silver Jubilee in May.

### The Air Mail Society

The Dowager Viscountess Downe presided over an open meeting of the newly formed Air Mail Society at Pagani's Restaurant, London, W., on February 20, when it was announced that within five weeks more than a hundred active members had been enrolled, and applications were being received by the Hon. Secretary at the rate of several a day. A committee of experts is in process of formation to pass judgment upon air mail stamps and material of doubtful authenticity; the constitution of the committee will be announced at the next meeting. A reference library and an exchange packet are also *en train*.

At the next meeting, to be held on March 7, Mr. R. E. R. Dalwick, the well-known air stamp authority, has promised to exhibit his important collection of air post stamps, and the Society will meet in London every month, except during the summer.

Those interested in the Society's activities can obtain all particulars of membership, etc., from Mr. R. D. E. Harker, "Stonea," Bullsmoor Lane, Waltham Cross, Herts.

### Latest Air Stamps

Additions to the air stamp collection have not been particularly numerous during the past month, and at the present rate of progress the output for 1935 will fall below the average. The long-promised new set of Government air mail stamps from Bolivia has at last materialised in ten denominations ranging from 5 centavos to 5 Bolivars, and embracing two different designs, the one showing an aeroplane passing over a South American landscape and the other a portrait of Mariano Baptista. Russia has produced, however, a striking series of air mail stamps dedicated to the "Heroes of the U.R.S.S.," and depicting the gallant aviators who rescued the survivors of the Schmidt Antarctic Expedition from the ice-fields 150 miles from the North Cape when the Soviet ice-breaker *Tcheliuskin* was caught in the ice-pack and wrecked in February, 1934. The subjects of the ten vignettes portray the various airmen with their planes engaged in the rescue work, the issue being limited to 50,000 sets, available for air mail purposes only.

In the Sudan the remaining stocks of 3 milliemmes and 4½ piastres air mail stamps recently withdrawn from circulation have now been reissued surcharged with the new air mail rates of 7½ and 10 piastres respectively.

### New Zealand's New Air Stamps

A peep at the new air port of New Plymouth, N.Z., with Mount Egmont rising in the background, is afforded by the design of three new air mail stamps that have been printed by the Commonwealth Banknote Printer in Melbourne to the order of the New Zealand Government in denominations of 1d. red, 3d. claret, and 6d. purple. At the side of the vignette a Maori is seen watching the flight of the aeroplane, whilst the inscriptions read "Air Mail" and "New Zealand Terminal." The lowest value is for use in connection with the recently inaugurated inland air mail service by which letters are conveyed at the uniform rate of 1d. within the Dominion boundaries.

### Belgium to Congo Air Mail

Souvenir envelopes were issued by the Belgian Air Lines (Sabena) for use on the inaugural flight of the regular fortnightly air mail service which left Brussels on February 23. Although the majority of the letters were franked by Belgian stamps, a limited number were of British origin and pre-paid in stamps of Great Britain at the rate of 1s. 3d. per half ounce. The return flight from Leopoldville, in the Belgian Congo, was scheduled for March 6.

### "Daggers" for the R.A.F.

The twenty-first ordinary general meeting of D. Napier and Son, Ltd., was held at Acton last week, Sir Harold Snagge, K.B.E., chairman, presiding. Referring to the balance sheet, Sir Harold said the condition of their finances was not less essentially robust than it was a year ago. He regretted once again to report a trading loss and the non-payment of a dividend on the non-cumulative Preference and Ordinary shares, but the turnover of the business had been slightly increased, and on balance the year's operations showed a net profit of £20,329, compared with £17,044 a year ago. They had paid the full dividend on the 7½ per cent. Cumulative Preference capital and had carried to the next account the sum of £87,030, against £89,201 brought forward from 1933.

Speaking of the new air-cooled engines developed by the company, Sir Harold said that an order was shortly to be placed by the Air Ministry for "Dagger" engines with which to equip a squadron of aeroplanes for the Royal Air Force. (In its latest form the "Dagger" gives a maximum of 760 h.p. at 12,250 ft.). The action of the Air Ministry in ordering these engines entitled the company to regard it as a good omen for the future career of "Dagger" and "Rapier" engines both in Service and civil machines in this country and abroad. Satisfactory progress had been made with the "Culverin" and "Cutlass" compression ignition types, and an order for "Culverin" is in course of execution for the Government.

### NEW COMPANIES

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### PUBLICATIONS RECEIVED

*Practical Solution of Torsional Vibration Problems.* By W. Ker Wilson. Price 25/- net. London: Chapman & Hall.

*The South American Handbook.* 1935 Edition. Price 2/6d. net. London: Trade and Travel Publications Ltd., E.C.3.

*Swinging the Equator.* By W. J. Makin. Price 18/- net. London: Jarrolds, Ltd.  
*Report of the Federal Aviation Commission.* January, 1935. 74th Congress, 1st Session. Senate Document No. 15. United States: Government Printing Office, Washington.

### AERONAUTICAL PATENT SPECIFICATIONS

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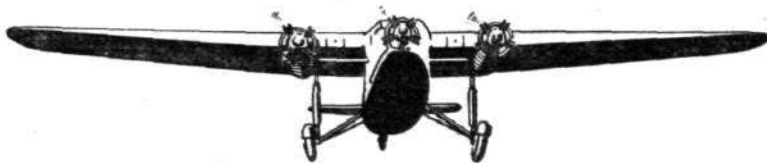
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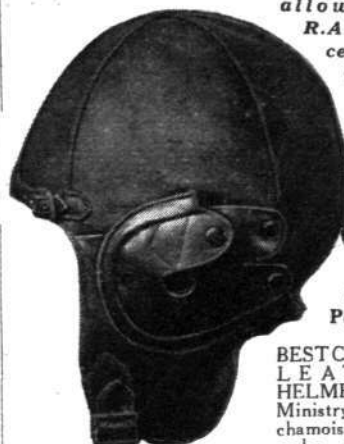
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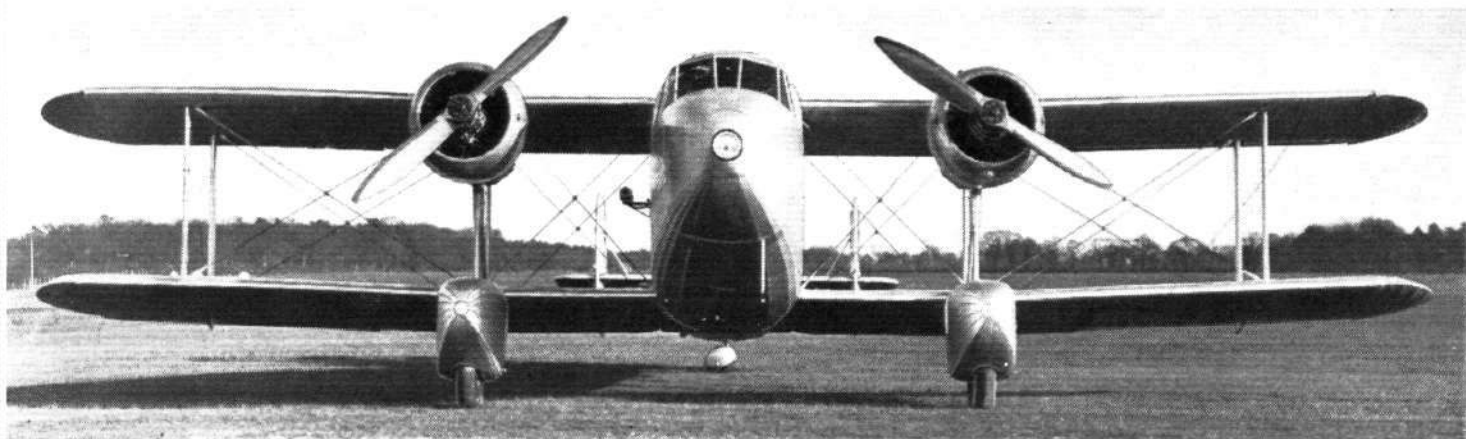
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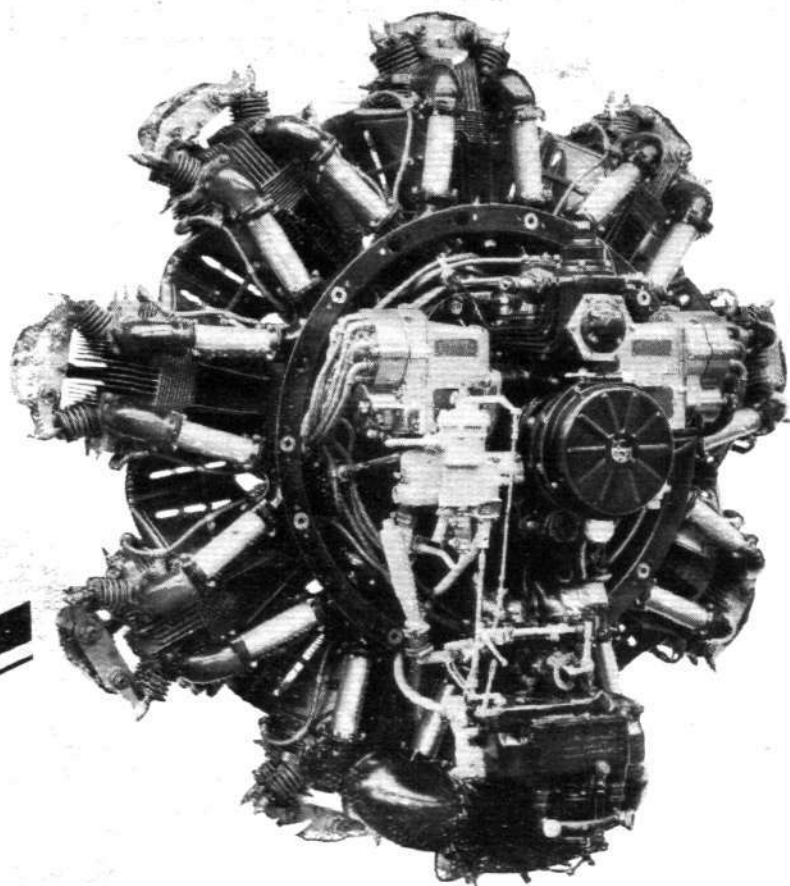
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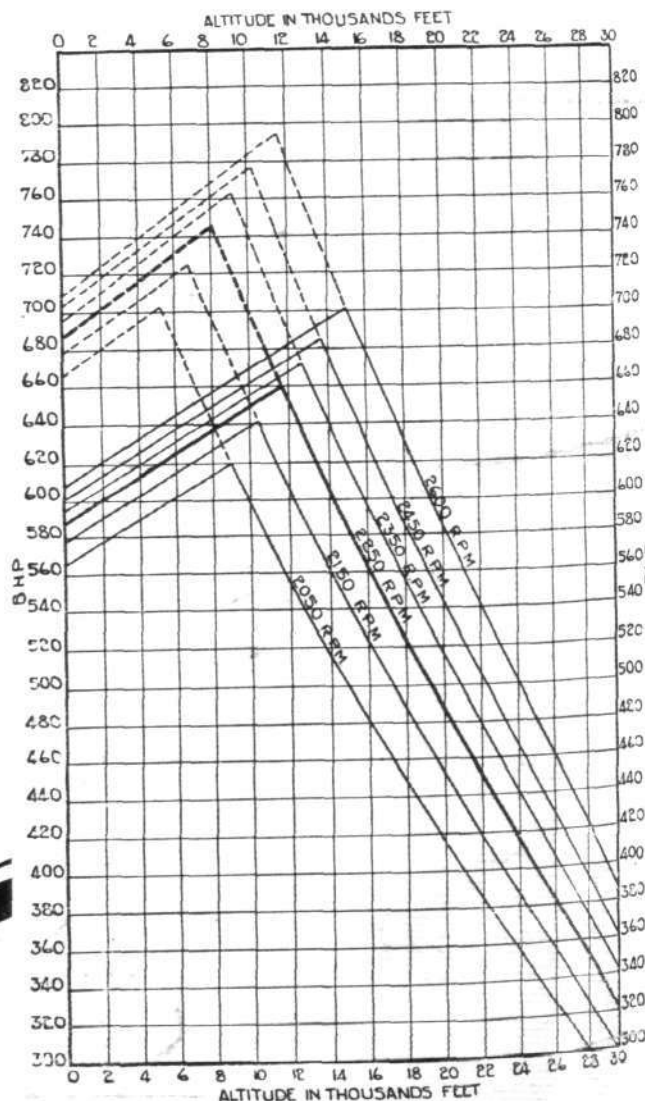
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#### PERFORMANCE DATA.

Normal Engine r.p.m....	2,250
Maximum Engine r.p.m. ....	2,600
B.H.P. for take-off at Sea-Level	
at normal r.p.m. ....	675/700
Rated Output at normal r.p.m. 640/670 at	
11,500 feet	
B.H.P. at maximum r.p.m. ...	680/710 at
15,000 feet	
Fuel Specification ....	D.T.D.230
Minimum octane value ....	87

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